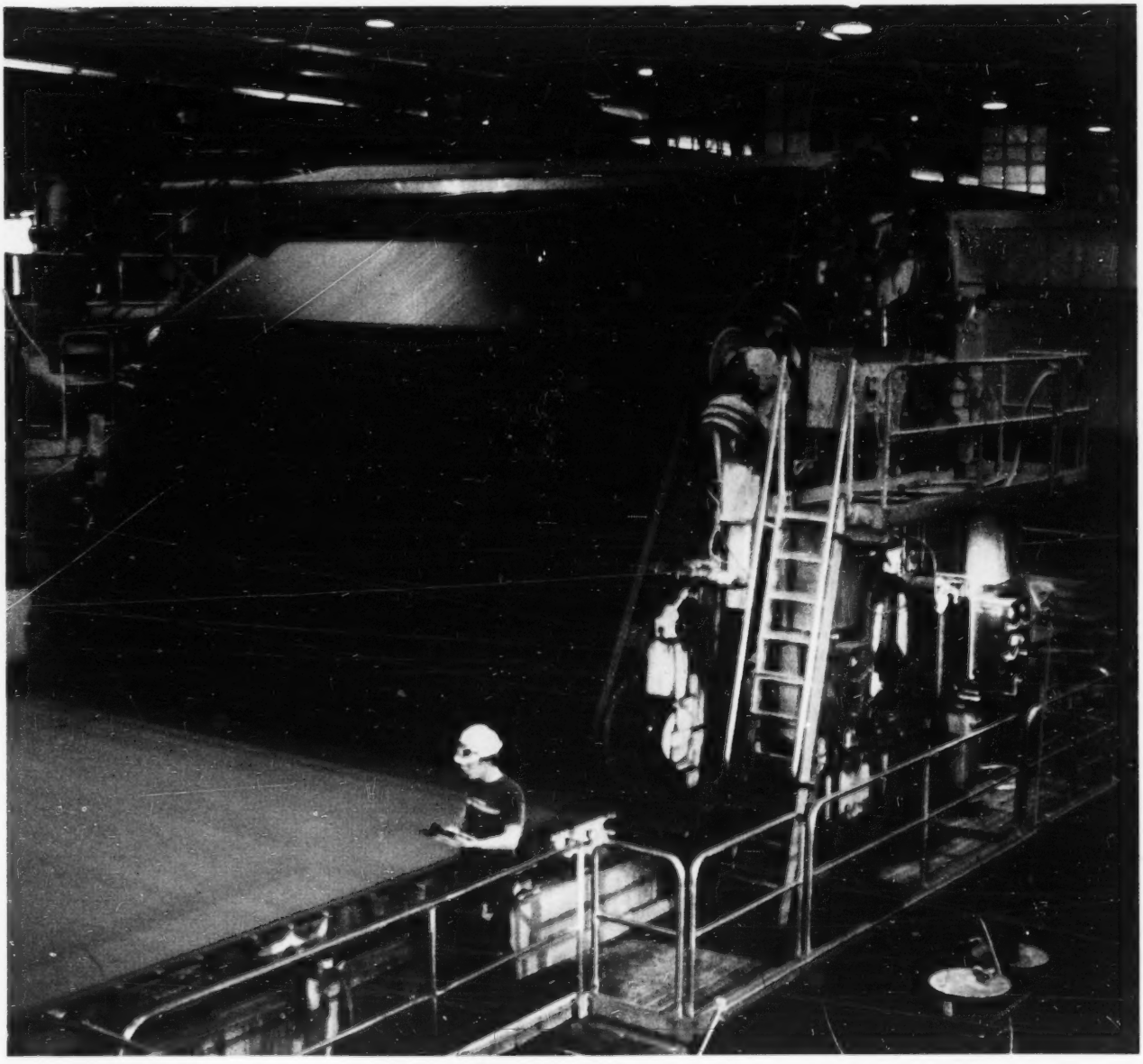
PULP & PAPER

August 1986



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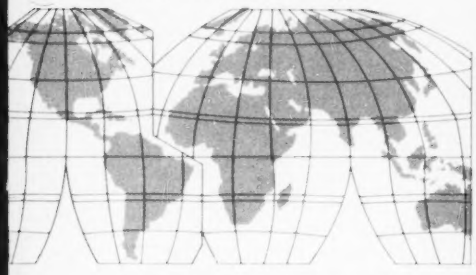

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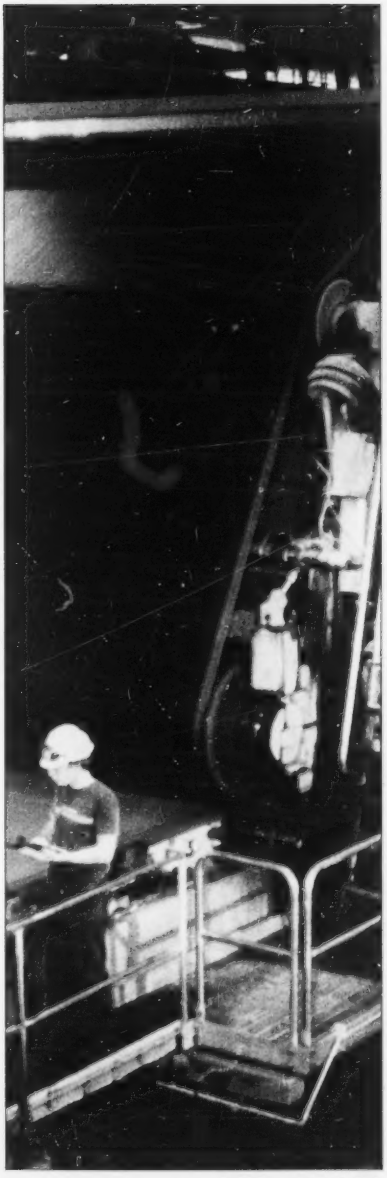

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World's first machine to produce 100% recycled newsprint has been upgraded to a twin-wire configuration at Garden State Paper, Garfield, N.J. (Photo courtesy of Garden State Paper.)

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PULP & PAPER (ISSN 0033-4081) is published monthly except November when semimonthly by MILLER FREEMAN PUBLICATIONS, 500 Howard St., San Francisco, Calif. 94105. Second class postage paid at San Francisco and at additional mailing office.

POSTMASTER: Please send Form 3579 to PULP & PAPER, 500 Howard St., San Francisco, Calif. 94105.

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Circulation Department, PULP & PAPER,
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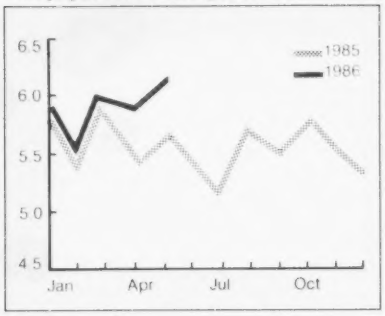
U.S. paper and board production



U.S. production of paper and paperboard in May totaled 6.1 million tons, up 5.5% from the same month last year, according to American Paper Institute data. The trend of production continued at a record pace, as the annualized rate jumped to 70.5 million tpy for the month, a solid 4.4% higher than last year's total. Preliminary data show that trend continuing into June.

Among major grades, production through May is up in everything except packaging and coated papers. Led by impressive gains in uncoated free-sheet, printing and writing papers were up 3.0% for the month from very strong levels in May 1985. Rising 6.3% overall, paperboard grades are particularly strong thanks to healthier export markets and strong domestic demand. The turnaround in unbleached kraft linerboard exports is particularly dramatic, with production for export jumping 17.7% in May. Although down slightly from April, corrugated box shipments in May set a new record for the month.

Canadian newsprint shipments totaled 771,000 tons in May, up 3.5% from last year. Strong consumption is reflected in the 7.0% drop in inventories of Canadian newsprint at U.S. plants. Woodpulp shipments through May were up 13.2%. ■

	Latest month (000 short tons)		% change from year ago	Annualized year-to-date (000 short tons)	% change from year ago
PAPER & PAPERBOARD PRODUCTION [1]					
Newsprint	May	492	6.7	5,589	1.6
Uncoated groundwood (s)	May	120	3.4	1,489	−0.1
Coated paper (s)	May	497	0.2	6,044	−3.8
Uncoated free sheet (s)	May	876	6.4	10,414	7.7
Other printing/writing	May	116	1.8	1,381	2.4
Total packaging and other paper (s)	May	453	2.0	5,238	−0.4
Tissue	May	456	8.8	5,145	4.6
Total paper	**May**	**3,009**	**4.8**	**35,300**	**2.5**
Unbleached kraft paperboard	May	1,530	7.9	17,365	4.9
Semichemical medium	May	457	6.0	5,275	4.5
Bleached paperboard	May	373	13.7	4,330	9.1
Recycled paperboard	May	705	−0.4	8,267	8.8
Total paperboard	**May**	**3,065**	**6.2**	**35,237**	**6.3**
Total U.S. paper and paperboard output	**May**	**6,074**	**5.5**	**70,537**	**4.4**
PULP, WASTEPAPER & FIBER [2]					
Total U.S. woodpulp production	Apr.	4,604	4.8	56,101	2.7
Market pulp production	Apr.	590	4.8	7,310	4.1
Wastepaper consumption at paper/board mills	Apr.	1,345	8.0	16,329	5.7
Pulpwood consumption (cords)	Apr.	7,742	8.3	91,083	4.0
CONVERTED PRODUCTS STATISTICS [3]					
Corrugated box shipments (billion ft²)	May	23.365	4.7	116.487[6]	3.9
Containerboard inventories at U.S. box plants and mills	May 1	2,438	−18.4		
INTERNATIONAL TRADE [2]					
U.S. paper imports (including products)	Apr.	854	−9.1	11,095	−1.3
Imports of Canadian newsprint	Apr.	626	−12.2	8,067[6]	−2.3
U.S. paper exports (including products)	Apr.	408	16.2	4,604	15.0
Exports of unbleached kraft linerboard	Apr.	198	39.4	2,113	23.7
Exports of woodpulp	Apr.	358	9.1	4,443	18.5
Norscan pulp inventories[4]	May 30	1,077	−26.5		
Norscan pulp operating rates[4]	May	88%	86%	90%	89%
CANADIAN STATISTICS [5] *(reported in metric tons)*					
Total newsprint shipments	May	771	3.5	3,734[6]	−0.5
Operating rates	May	94%	94%	92%	94%
Inventories held by U.S. consumers	May 30	1,378	−7.0		
Other paper/board shipments	May	504	5.2	2,481	8.6
Woodpulp shipments (export only)	May	612	4.4	3,162[6]	13.2
Operating rates	May	92%	83%	91%	87%

1. American Paper Institute. 2. API, Bureau of Census, American Pulpwood Assn. 3. Fibre Box Assn., Paperboard Packaging Council. 4. North American/Scandinavian paper-grade market pulp. 5. Canadian Pulp & Paper Assn. 6. Not annualized. (s) = Shipments.

BLEACHED PAPERBOARD: Dollar is key to continued strength overseas and domestic price stability

Grade structure: Solid bleached sulfate (SBS) paperboard is used primarily in folding carton and milk carton stock. Secondary uses include file folders, linerboard, lightweight and heavyweight cup and round nested food containers, plate, dish and tray stock, and other packaging and nonpackaging uses. Calipers range from 10 to 28 pt, in low-, medium- and high-density levels. Basis weights vary from 120 to 300 lb/3,000 ft². About half of the SBS produced is coated.

Production/capacity: Production in 1985 was down 1.9% to 3.97 million short tons after having risen over 10% in the previous two years to 4.05 million tons in 1984, according to the American Paper Institute. As a result, operating rates fell to 90.8% in 1985 from 96.7% in 1984, a record year. Exports, however, have steadily declined in recent years. Last year, they fell again, to 459,000 tons from 478,000 tons in 1984.

Operating rates held up relatively well last year despite the downturn in demand and an additional 190,000 tons in capacity that came onstream through various machine upgrades. Production remained depressed through much of the first three quarters of 1985 but began to pick up rapidly in the final three months as the U.S. dollar weakened in relation to other currencies and export orders increased.

By end use, 1985 production of milk carton stock fell 5.7% to 608,000 tons; folding carton stock was down 1.7% to 1.816 million tons; plate, dish and tray stock was relatively flat with a 0.5% decline to 289,400 tons; heavyweight and lightweight cup, round nested food containers, and cup lids were up 3.6% to 431,500 tons; linerboard was down 3.8% to 114,000 tons.

For the first four months of 1986, SBS production rose 6.4% from a year earlier. Milk carton stock production was up 14%; file folder, up 13%; plate, dish and tray, up 10%; folding carton, up 5.8%; heavyweight cup, up 1.9%; and bleached linerboard, up 1.2%, according to industry reports.

Outlook: With an additional 175,000-tpy machine starting up at Westvaco Corp.'s Covington, Va., mill in March, and an estimated additional 242,000 tons of capacity expected to come online by 1988, operating rates could remain relatively low.

Much depends on currency exchanges and national economies in international markets, as well as product mixes at individual domestic mills. According to API, 112,000 tons of the additional capacity slated to start up during 1986-88 represent machine swings from production of bleached kraft pulp from SBS board, which can be altered on short notice.

Another variable in the market's stability will be the final plans for Federal Paper Board Co. Inc.'s No. 3 machine at the Augusta, Ga., mill. The company is studying a possible expansion there that would increase capacity by about 150,000 tpy.

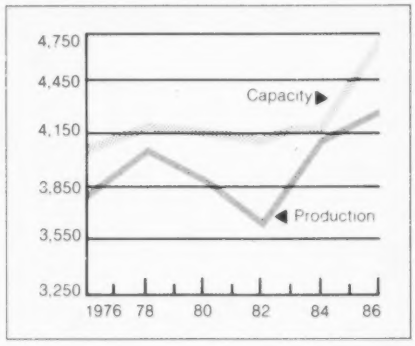
API forecasts SBS capacity will rise by 289,000 tons this year and 129,000 tons over the next two years, reaching 4.792 million tons in 1988.

Production is expected to rise 8.1% this year to 4.292 million tons, with the biggest increases occurring in folding cartons, nonpackaging, and linerboard. Exports should remain good if the dollar does not strengthen. An increase in capacity to 4.664 million tons, however, should keep operating rates at about 90.0%.

Prices: Steep discounting that had reduced transaction levels to as low as $500 in 1985, with some spot market offerings even lower, began to disappear during the final weeks of last year. By April of this year, most bleached board producers succeeded in implementing hikes. This brought the range to $550/$600 from $530/$600 for the bulk of business. More hikes were posted for July to increase levels to $570/$600.

SBS 15-pt coated folding carton board (rolls), $/short tons, year end: 1973, $300; 1974, $360; 1975, $360/$365; 1976, $385; 1977, $405; 1978, $425/$445; 1979, $490; 1980, $550; 1981, $625; 1982, $590/$625; 1983, $590; 1984, $590/$665; 1985, $550/$590; 1986 (June), $550/$600. ■

SUPPLY/DEMAND (000 tons)



FORECAST (000 tons)

	1984	1985	1986e
Production	4,048	3,972	4,292
Capacity[1]	4,187	4,375	4,664
Utilization rate	96.7%	90.8%	92.0%
Imports	—	—	—
Exports[2]	478	459	496
Apparent U.S. consumption	3,570	3,513	3,796
lb/capita	30.20	29.43	31.52
GNP ratio	1.02	0.98	1.04

e = Estimate.
1. Because of grade switching, capacity utilization is difficult to define.
2. API production for export.

TOP U.S. PRODUCERS (000 tpy)

	Annual capacity	Market share (%)
1. Federal Paper	825	17.7
2. International Paper	750	16.1
3. Westvaco[1]	540	11.6
4. Potlatch	532	11.4
5. Temple-Eastex[2]	357	7.6
6. Champion Intl.	250	5.4
7. James River	219	4.7
8. Weyerhaeuser	200	4.3
9. Gulf States	190	4.1
10. Gilman Paper	175	3.7

Market share of top five companies:
64.4%

Market share of top ten companies:
86.6%

Total U.S. capacity (1986):
4.664 million short tons

1. Brought online in March 1986 a new 175,000-tpy bleached board machine at the Covington, Va., mill.
2. Does not include 112,000 tpy of bleached bristols.

"The sale also means that we will be able to redirect significant capital resources to high-tech processes and production equipment at our remaining three mills and 20 box plants," he noted. "Our objective will be to become the marketing and quality leader in the corrugated box industry, not the growth leader." Examples of this are O-I's Proprint preprinted linerboard and its Ultrastak high-performance containerboard, and Compak computer-aided packaging design.

Robert J. Lanigan, O-I chairman and CEO, cautioned in a recent interview that the forest products unit's profit recovery may not be as rapid as some analysts project. "There's no question that forest products have turned around and are improving—it's a matter of how long it takes to execute an increase in the price of linerboard." Linerboard, which sold for as low as $250/short ton last year and now sells for about $290/ton, will increase in price to the range of $315 to $320/ton—but not until August, he said.

Lanigan said that O-I's overall capital spending would be slightly under $250 million for 1986—down from $260 million last year—and should be in the $200- to $250-million range next year. Part of those expenditures will be going to the forest products division, but "we avoided a big one by selling our Orange, Texas, mill," Lanigan noted. ■

Stone pursues talks with Jacksonville Kraft Paper

Stone Container Corp. has signed a letter of intent with Abraham Zion, owner of Jacksonville Kraft Paper Co. Inc., to manage the idle Jacksonville, Fla., linerboard and kraft paper mill. Stone will manage the mill only if it has been returned to working condition, the required operating permits have been obtained, a union agreement satisfactory to Stone has been reached, and "satisfactory capitalization" has been supplied by Zion.

As reported earlier, these conditions will be hard to fulfill because the mill was shut down last fall before its tanks and recovery boiler were emptied (*P&P*, July, p. 23). Improvements to the power boilers are also needed before particulate emissions are within legal limits.

If these conditions are fulfilled, Stone will manage the mill and collect a management fee. It will have an option to buy a 50% or 100% equity in the mill after five years at a price to be determined at that time. The mill has capacity for 333,000 tpy of linerboard and 123,000 tpy of kraft paper.

■ **Boise Cascade Corp.**'s purchase of the Jackson, Ala., pulp and paper mill of the Allied Paper Div. of Hanson Trust plc closed on July 1. Hanson plans to sell the rest of Allied Paper, which it acquired from SCM Corp. earlier this year, including a 415-tpd nonintegrated coated and uncoated paper mill in Kalamazoo, Mich. Also for sale is SCM Allied/Egry Business Systems, which owns about seven continuous business forms plants. A spokesman for Allied Paper said that Hanson is not actively soliciting buyers at this time, but that the future sale of these units is planned. ■

Abitibi-Price sells idle Stephenville pulp mill

Abitibi-Price Inc. has sold the machinery of its idle kraft pulp mill in Stephenville, Nfld., to a company called SIDFRA, based in France. SIDFRA has divided the machinery into ten operating units and is soliciting buyers for the equipment, which includes two Kamyr continuous digesters, a wood preparation plant, screen rooms, a stock preparation plant, a drying machine, the recovery boiler, and the entire recovery system.

The kraft pulp mill was built by the now defunct Javelin Paper Corp. to produce furnish for unbleached kraft linerboard. It operated during 1973-76, at which time Abitibi-Price bought the property and converted the linerboard mill to newsprint production, subsequently idling production at the kraft pulp mill. ■

MERGER BRIEFS

■ **DuPont Co.** announced that it will sell its U.S. cellophane business to Flexel Inc. for an undisclosed amount. DuPont said that the sale of its cellophane plant in Tecumseh, Kans., represents its withdrawal from the cellophane business. The 240 employees affected by the transaction will be offered jobs by Flexel. Flexel, of Atlanta, Ga., recently purchased Olin Corp.'s Covington, Ind., cellophane plant.

■ **Imasco Ltd.** said it is soliciting bids for **Genstar Corp.**'s nonfinancial assets, including its building products division. This spring, Imasco acquired Genstar (*P&P*, May, p. 23). It is selling these assets in seven or eight packages and said that it hopes to have completed all sales in two years. The company intends to hold on to Genstar's financial services businesses, including Canada Trustco Mortgage Corp., Canada's largest trust. Imasco expects its profits next year to exceed those of 1986, despite a decline in earnings at its Imperial Tobacco Ltd. subsidiary. Imasco's purchase of Genstar reportedly has made a "somewhat positive contribution" to Imasco's 1986 earnings.

■ **Mosinee Paper Corp.** has adopted a poison pill plan to deter takeovers. The plan allows holders of common stock to purchase shares in a surviving company for half price. ■

COATED GROUNDWOOD

Rise in paper use seen by magazine publishers

Publisher's demand for magazine paper in 1986 is expected to increase by 2.1% over 1985 figures, according to the annual survey just recently released by the Magazine Publishers Assn. The 98 publishers that responded to the survey are among the principal forces in the magazine industry.

This increase brings the estimated consumption figure for this year to 1.62 million tons. For 1987, a heftier increase of 3.7% was forecast, which would boost consumption for that year to 1.68 million tons.

In many respects, the results of this year's survey parallel those of last year. Because of the uncertainty in the strength of the economy for the

Projected paper consumption by U.S. magazine publishers (000 tons).

	1985 actual	1986 projected	% change vs 1985
Coated groundwood	1,122	1,165	3.8
Coated free-sheet	172	164	−4.5
Uncoated groundwood	218	215	−1.3
Uncoated free-sheet	24	24	0.3
Imports	55	56	2.3
Total	**1,591**	**1,624**	**2.1**

Source: Magazine Publishers Assn.

short term, publishers in both surveys predicted more modest gains for the current years, saving more optimistic predictions for later on.

The actual 1985 usage figure of 1.59 million tons fell short of the 1.61 million tons that were estimated for 1985 in last year's survey, and the current 1966 estimate has now been revised downward from the 1.68 million tons originally forecast.

The same trend is apparent in the figures for coated groundwood paper consumption. While coated groundwood is by far the predominant grade used by magazine publishers, here also actual 1985 usage fell short of that predicted in 1985's survey.

Currently, a coated groundwood paper increase to 1.16 million tons is projected for 1986, whereas last year the 1986 projection was 1.22 million tons. This year's projection for 1987 is for a 4.3% increase over the current 1986 figure to 1.22 million tons. The actual amount used in 1985 was 1.12 million tons.

The use of imported paper has steadily declined over the last several years, accounting for 3.5% of the total paper usage in 1985. This is not expected to change for 1986 and is to drop to 3.4% in 1987. It was reported that 16% of those surveyed used imported paper in 1985, 13% plan use in 1986, and 12% in 1987.

While only a small shift in basis weight is expected for 1985-87, these breakdowns are a bit changed from those reported in 1980. There has been a drop from 52.9% in 1980 to 47.1% in 1985 for paper in the 32- to 36-lb range. Paper 38 to 50 lb rose from 37% in 1980 to 41.2% in 1985, while 10.1% of paper was 60 lb or more in 1980, compared with 11.7% in 1985.

In terms of the tonnage allocated to the different printing processes, the majority of printing will be done on offset presses (74% of the total), while gravure printing will account for around 27%.

It remains to be seen how closely these usage estimates match what will actually happen for the remainder of this year. A paper industry executive contacted recently said that shipments to magazine publishers of coated No. 5 grades were down 11.8% during the first four months of this year. If the sluggish advertising climate so far continues, publishers may find their paper consumption needs are less than anticipated. ■

CANADIAN CAPACITY

Printing/writing paper capacity surges

Canada's capacity for printing/writing paper is expected to increase by 31%, or 700,000 metric tons, during 1985-88, reflecting increased emphasis on higher value added grades. But the Canadian Pulp & Paper Assn.'s annual capacity survey shows slim growth for bleached kraft market pulp and newsprint—Canada's No. 1 and 2 export grades. In releasing the survey, Howard Hart, president of the CPPA, noted that the industry is pulling out of a period of poor earnings that "simply did not encourage increases in manufacturing capacity."

Total pulp capacity is projected to be 24.9 million tons by 1988—a 4.3% increase over 1985. This reflects an annual growth rate of 1.4%, up from 0.6% for the 1975-85 period. Market pulp capacity is expected to increase by 172,000 tons in 1985-88, a 2.2% rise, indicating an annual growth rate of 0.73%. Canada's market pulp capacity accounts for one third of its total pulp capacity and is to reach 7.9 million tons by 1988.

By 1988, Canada's paper and board capacity will increase to 17.6 million tons, or 7% over last year's level. Newsprint capacity will increase by 380,000 tons—an increase of 3.8% compared with a 9% increase during 1980-83. Capacity for containerboard and boxboard is expected to grow 3% due to minor upgrades. Kraft papers, sanitary papers, and specialty papers will grow between 1% and 2%.

The Atlantic provinces will reap the benefits of 16.9% of the paper and board capacity expansions, followed by Quebec with 8%, and the prairie region with 6.1%. Quebec will gain 9% of the new pulp capacity, far exceeding pulp capacity additions in the other provinces.

Canadian industry annual capacity growth, 1985-88 (000 metric tons).

Market pulp	**1985**	**1986**	**1987**	**1988**
Sulfite paper grades	305	308	310	310
Sulfate paper grades	6,624	6,716	6,756	6,753
Bleached softwood	5,233	5,327	5,387	5,398
Semibleached softwood	420	443	430	428
Bleached hardwood	794	773	770	757
Unbleached	177	173	169	170
Total chemical paper grades	**6,929**	**7,024**	**7,066**	**7,063**
Dissolving and special alpha	266	266	266	266
Mechanical	574	587	604	612
Total market pulp capacity	**7,769**	**7,877**	**7,936**	**7,941**
Increase from previous year	99	108	59	5
	1.3%	1.4%	0.7%	0.1%
Paper and board				
Newsprint	9,820	10,040	10,080	10,200
Groundwood printing	1,040	1,160	1,285	1,335
Book, writing, misc.	1,213	1,280	1,440	1,618
Kraft papers	541	547	548	546
Sanitary papers	462	468	468	471
Special papers	40	41	41	41
Containerboard	1,869	1,894	1,916	1,930
Boxboard	798	806	819	823
Total	**15,783**	**16,236**	**16,597**	**16,964**
Building, other	649	650	651	651
Total paper, board capacity	**16,432**	**16,886**	**17,248**	**17,615**
Change from previous year	140	454	362	367
	0.9%	2.8%	2.1%	2.1%

Source: Canadian Pulp & Paper Assn.

Printing/writing paper. Most of the capacity additions in groundwood printing and specialty papers will come from conversions of newsprint machines, including those at Abitibi-Price Inc.'s mills in Alma and Kenogami, Que., and MacMillan Bloedel Ltd.'s Powell River, B.C., mill. A new coated groundwood machine at Miramichi Pulp & Paper Inc.'s mill in Newcastle, N.B., and a new uncoated free-sheet machine at Domtar Inc.'s mill in Windsor, Que., along with a new coater at Kruger Inc.'s Trois Rivières, Que., mill, will increase capacity of book and writing paper by approximately 405,000 tons by 1988—a capacity increase of 33%.

These figures exclude Makin Pulp & Paper Ltd.'s proposed 150,000-tpy coated groundwood mill in Britannia Beach, B.C. Nor do they include Weyerhaeuser Canada Ltd.'s 180,000-tpy uncoated free-sheet machine that is slated to start up at Prince Albert, Sask., in 1989 or the 200,000-tpy supercalendered paper mill on the Matane Peninsula of Quebec that is being studied by Saugbrugsforeningen of Norway and Rexfor Ltd.

Newsprint. Three companies are planning to make the addition of one new newsprint machine to their Quebec mills: James Maclaren Industries Inc.'s mill in Masson, CIP Inc.'s mill in Gatineau, and Donohue Inc.'s mill in Clermont. Newsprint capacity will only exhibit a growth rate of 3.8%, however, because of the conversions and idling of some older machines.

Market pulp. Canada is the largest producer in the world of paper-grade chemical market pulp, and approximately 90% of the country's production is being exported. British Columbia accounts for about half of the country's market pulp capacity. Most of the pulp produced in that province is bleached softwood sulfate.

Capacity for dissolving and unbleached sulfite market pulps is expected to remain unchanged. Sulfate capacity will increase by 1.9%, or 129,000 tons over the period. Still, the growth rate for sulfate capacity sold on the market will decline by 0.3% compared with 1975-85. British Columbia will account for 90% of the 173,000 tons of bleached and semi-bleached softwood pulp capacity expected to come onstream. Hardwood sulfate and unbleached sulfate will fare less well. CPPA expects capacity for these grades to decline by 37,000 tons and 7,000 tons, respectively.

Capacity for market mechanical pulp is expected to increase by 38,000 tons by 1988, or 6.6%. The CPPA expects the recent start up of Tembec Inc.'s mill in Temiscaming, Que., to make up for the tonnage lost when Miramichi Pulp & Paper integrated its Newscastle, N.B., mill. CPPA projections do not include the new 177,500-tpy bleached CTMP mill that has been proposed for Alberta by Millar Western Industries Ltd. or the market CTMP mill being studied by Fibreco Export Inc. in British Columbia. ■

LABOR

Workers strike Weyco sawmills and five pulp mills

Striking sawmill workers shut down five Weyerhaeuser Co. pulp mills in Oregon and Washington for two days last month but voluntarily stopped picketing the pulp mills.

The mills are in Everett, Longview and Cosmopolis, Wash., and Springfield and North Bend, Ore. The 2,000 employees at the five mills decided to stay off the job for two days. The workers are members of the Assn. of Western Pulp & Paper Workers; their contract includes a no-strike clause.

More than 7,300 Weyco lumber and logging workers voted to remain on strike in Oregon and Washington. They rejected a contract that included a 25% cut in pay and benefits. The company has not said what its next move will be, but noted that hiring replacements "is one of our options."

The 2,700 workers at Champion International Corp. also voted down their company's "final offer. A Champion spokesman said the company was "disappointed" that union members rejected an offer that their leaders had recommended.

Weyco said the rejected contract was its "last and best hope" of settling the strike, which started in mid-June and affected company mills and logging operations in the Northwest. Two unions, the Lumber, Production & Industrial Workers and the International Woodworkers of America, represent the employees and have been bargaining together.

Union workers at two other Northwest lumber producers, Boise Cascade Corp. and Willamette Industries Inc., are also voting on proposed contracts. About 6,000 employees are affected. Like Champion and Weyerhaeuser, these companies reportedly want to cut wages and benefits.

The strike cuts Weyerhaeuser's lumber capacity by about half, and may lead to upward pressure on chip prices in the Northwest. So far lumber prices have not responded to the strike. North America's large sawmill overcapacity plus Weyco's shipments from inventory have kept markets supplied. ■

UPIU, IBEW conclude talks at Mead's Escanaba, Mich., mill

Members of the United Paperworkers International Union along with members of the International Brotherhood of Electrical Workers concluded negotiations at Mead Corp.'s 1,314-tpd Escanaba, Mich., printing papers mill. The new three-year pact gives workers a $1,200 lump sum payment in the first year and 3% increases in each of the next two years. Also included is a provision that gives the company greater operating flexibility. The contract expires May 31, 1989. ■

LABOR BRIEFS

■ UPIU sources said that **Hammermill Paper Co.**'s 550-tpd uncoated free-sheet mill located in Erie, Pa., had reached a new four-year agreement calling for a $750 lump sum payment in the first and third years, a 2% increase in the second year, and a 30¢/hour increase in the final year. The contract expires June 9, 1990.

■ **Sonoco Products Co.** concluded talks with members of the UPIU at its 230-tpd recycled board mill in Holyoke, Mass. The new three-year pact, which expires June 26, 1989, calls for a $1,000 payment in the first year and 3% rises in each of the next two years, with a dental plan in the second year.

■ UPIU members ratified a new contract at **Scott Paper Co.**'s S.D. Warren Co. division's 400-tpd fine papers mill in Muskegon, Mich. The agreement, which runs from June 16, 1986, to June 15, 1988, calls for wage increases of 3% each year.

■ UPIU workers approved a new three-year contract with **Procter & Gamble Paper Products Co.** at the company's two tissue mills at Green Bay, Wis. The contract calls for a $500 signing bonus and a 4% lump sum payment in the first year and wage increases of 3.5% in each of the next two years, expiring Apr. 31, 1989. ■

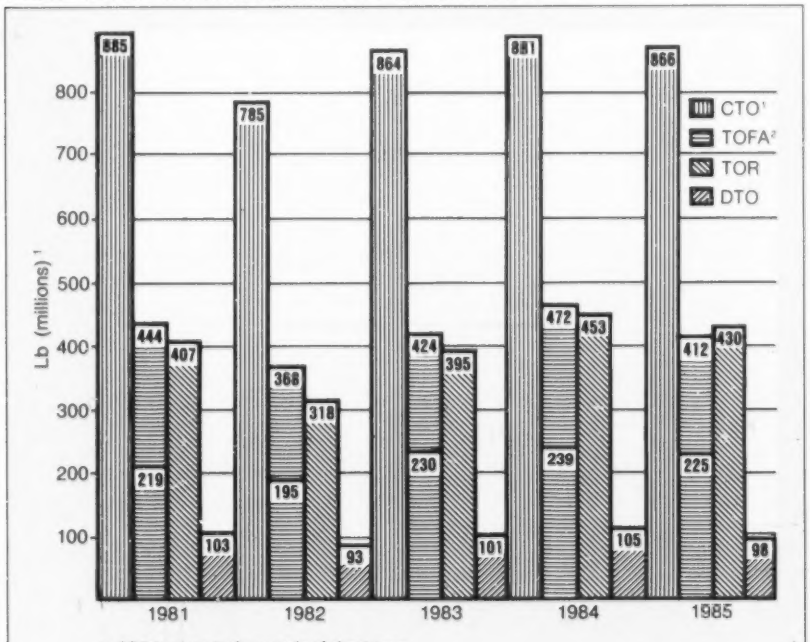
Crude tall oil: turnaround in supply; price could fall to record low

Production. Tight supply of crude tall oil (CTO) persisted in 1985 as production fell nearly 2%, but at the close of second-quarter 1986, the situation may be reversing. Evidence of the turning point in demand includes inventory shifts as tall oil fatty acids (TOFA) stocks soar and tall oil rosin (TOR) stocks decline. TOFA fractions (both above and below 2% rosin content) produced totaled 206,000 short tons, a 10% drop from 1985. Softness in the end user markets and competition from other raw materials such as soya protein have put pressure on CTO fractionators. TOR production also fell 5% to 215,000 short tons. TOR markets are steady, as demand for fractionated products such as paper size and printing ink resins continue to show strength.

This business climate is reflected in the current bright market pulp picture, where production is holding up. *PULP & PAPER WEEK* reports that many Canadian and U.S. sulfate mills will not shut down during the summer, indicating an oversupply of CTO for the rest of the year. A factor to watch is pulp price. High inventories and weak demand could cause pulp prices to fall and force mills to take downtime in early autumn, perhaps easing CTO supply. The other major fraction, distilled tall oil (DTO), also fell in production by 7% to 49,000 short tons.

Six companies with combined CTO fractionating capacity of 1.75 billion lb operate in the U.S. At press time, Sylvachem (a division of SCM) had sold two facilities (the Port St. Joes fractionating complex and a small Mississippi processing plant) and its product line to International Paper Co. IP will integrate its value-added products through Arizona Chemicals, its wholly owned subsidiary, making IP the world's largest fractionator in terms of capacity. Outside the U.S., there are at least 21 CTO fractionators in 17 countries with capacity of 1.34 billion lb. The U.S. exports about 7% of its output. Inroads made by raw materials like vegetable oil- and tallow-based fatty acids are already established in the market and will continue to be price competitive.

FIGURE 1: **Production and distribution of crude tall oil fractions.**



1. CTO is given in thousands of short tons.
2. First number is total production; second number is production of less than 2% rosin content.

Factors curbing CTO production over the long term are many. Hardwood use is climbing, and softwood use is falling. Over the past ten years, the American Pulpwood Assn. estimates a 3% drop in softwood consumption in the South. Recycled fiber is also being utilized in greater proportions—even in high-strength papers such as kraft linerboard. As for new pulping lines, the trend is toward mechanical methods that yield little byproduct but raise fiber yield. CTO is also a potential fuel source, and its energy value usually dictates its use as fuel or as a saleable product. Due to the fluctuating energy situation, the fuel value of CTO is dropping as well, making it less likely to be consumed for energy and more likely to be sold at the best price.

New harvesting techniques that help to keep roundwood storage time down and innovative recovery ideas may offset some of these long-term losses. Other suggestions for higher yields include improved process control, skimming efficiency, and new systems, such as air injection, chemical addition (to stimulate soap flocculation), and electroflocculation.

Price. 1985's near-record CTO price levels have been somewhat maintained through second-quarter 1986. As recovery rates jump (perhaps by 15%) and pulp mills maintain high operating rates while CTO fractionators do not, the price may tumble below $130/ton f.o.b. for the first time in recent history. Fractionators commented that this is the level that they must achieve to regain markets lost in the past year. CTO prices climbed 75% from 1984 to 1985, while TOFA products achieved penny-per-pound increases throughout the same period, only to have them fall at the beginning of 1986. The opposite is true of TOR products. As a result, profit margins for fractionators are being squeezed, inventories are unbalanced, and market instability persists.

A report published by Hochberg & Co. of Chester, N.J., states that demand for fractionated CTO by 1994 will total 2.7 billion lb, while capacity reaches the 2.1-billion-lb level. Use for TOFA and TOR is projected to grow 2.5% annually for the next ten years, despite the cyclic nature of this commodity-based industry. ■

MORE PAPER, BUT PRICES AND PROFITS DECLINED LAST YEAR; '86 LOOKS GOOD

People's Rep. China took the lead in output growth; fluctuating value of the U.S. dollar made 1985 a difficult year, but 1986 holds promise

By PETER SUTTON, JOHN PEARSON, HUGH O'BRIAN, International Editors

Oversupply, weak pricing, and poor profits characterized 1985. Paper and board production declined in the world's largest market, North America, as well as in the European Economic Commmunity. It was left to Asia, helped marginally by the other major regions, to provide the final worldwide increase in output: 193 million metric tons, up 1.8% from 1984. Apparent consumption rose similarly, by 1.5% to 192 million tons.

World pulp output reached 140 million tons, up just 0.2%. Again, production fell in North America and the EEC. Total output from Scandinavia also dropped.

Oversupply of major pulp and paper commodity grades in the last quarter of 1984 was carried over into early 1985, and downtime to correct overcapacity was needed by the end of the year and into early 1986. The U.S. economy, which provided the impetus for the record year of 1984, showed a marked slowdown. Other economies followed, reducing the level of business.

In international trade, currency instability, which had so much dominated the end of 1984, continued to be a crucial factor in 1985. Early in the year, the dollar reached an all-time high against leading currencies. By the end of 1985, it had fallen by 30%. The effect was a staunching of U.S. and Canadian exports for the first half of the year, followed by a scramble to recover market share as the dollar fell. In Europe, sales moved out of dollars and into local currency prices. Overall, the dollar contributed to the weak prices that blighted the performance of much of the industry in 1985.

Of total world paper and board output, one ton in five was traded. The sum of all the reports that came in for *Pulp & Paper International*'s annual review shows imports (40.4 million tons) almost in balance with exports (41.3 million tons)—both were very close to 1984 levels. Pulp imports and exports balanced at 22 million tons.

Moving into 1986, the currency markets seemed to be more stable. This, combined with a general strengthening of demand and concerted downtime to avoid overca-

All figures in this review are in metric tons.

World's top 20 producing and consuming countries

PAPER AND BOARD PRODUCTION (000 metric tons)

	1985	% change 1985/84
1. U.S.	61,121	−1.8
2. Japan	20,469	+5.8
3. Canada	14,448	+1.2
4. U.S.S.R.	9,950	+3.4
5. Fed. Rep. Germany	9,178	+0.4
6. People's Rep. China	9,112	+20.5
7. Finland	7,444	+1.7
8. Sweden	7,003	+2.0
9. France	5,343	−4.0
10. Italy	4,587	−2.7
11. Brazil	4,054	+7.1
12. U.K.	3,766	+3.6
13. Spain	2,913	−1.3
14. Mexico	2,448	+9.3
15. Rep. Korea	2,311	+4.7
16. Taiwan	2,018	+4.6
17. Austria	1,922	+7.4
18. Netherlands	1,904	+1.0
19. Norway	1,624	+4.0
20. Australia	1,543	−0.8

PULP PRODUCTION (000 metric tons)

	1985	% change 1985/84
1. U.S.	49,144	−2.3
2. Canada	20,419	+0.4
3. Japan	9,279	+1.7
4. Sweden	9,123	−1.8
5. U.S.S.R.	8,320	+1.9
6. Finland	7,976	−0.7
7. People's Rep. China	6,365	+18.9
8. Brazil	3,722	−5.9
9. Fed. Rep. Germany	2,107	−0.9
10. Norway	1,978	+6.1
11. France	1,946	−5.2
12. Spain	1,439	+0.3
13. Portugal	1,388	+20.2
14. Austria	1,321	+7.5
15. New Zealand	1,145	+7.8
16. Czechoslovakia	1,116	+6.1
17. India	1,050	—
18. South Africa	1,030	+3.0
19. Australia	887	+6.6
20. Poland	878	−1.1

PER CAPITA CONSUMPTION (lb/year)

	1985	% change 1985/84
1. U.S.	626	−1.1
2. Sweden	518	+5.9
3. Canada	445	+1.0
4. Finland	417	+5.0
5. New Zealand	401	+38.0
6. Denmark	397	−2.2
7. Switzerland	395	+2.9
8. Fed. Rep. Germany	384	−1.1
9. Netherlands	377	—
10. Japan	370	−0.6
11. Belgium	370	+4.4
12. Luxemburg	362	+3.1
13. Hong Kong	357	+24.6
14. Australia	313	—
15. U.K.	306	+3.7
16. Norway	302	−6.2
17. Austria	287	+8.3
18. France	262	−5.6
19. Singapore	256	−6.4
20. Iceland	238	+14.9

REVIEW OF TOP 20 NATIONS IN PULP/PAPER PRODUCTION

Australia

Population: 15,749,000. Per capita consumption of paper and board: 142 kg/ 313 lb. Paper and board mills: 17. Pulp mills: 18 (sulfate: 2; sulfite: 1; semichemical: 4; mechanical: 8; nonwood: 1).

Paper/board capacity: 1,675,000 tons **Pulp capacity:** 1,158,000 tons

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Newsprint and other printing paper	601	619	—	—	—	—
Other paper and board	954	924	—	—	—	—
Total	**1,555**	**1,543**	**722**	**770**	**74**	**75**
Total pulp	**832**	**887**	**216**	**185**	**3**	**19**

Austria

Population: 7,557,500. Per capita consumption of paper and board: 130 kg/ 287 lb. Paper and board mills: 36. Pulp mills: 16 (sulfate: 3; sulfite: 7; semichemical: 1; mechanical: 6).

Paper/board capacity: 2,445,000 tons **Pulp capacity:** 1,518,000 tons
Operating rate 1985: 87% **Operating rate 1985:** 87%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	1,595	1,787	277	279	1,055	1,203
Board	327	340	25	24	231	245
Total	**1,922**	**2,127**	**302**	**303**	**1,286**	**1,448**
Chemical woodpulp	923	999	222	275	242	277
Other pulps	306	322	29	40	5	0
Total	**1,229**	**1,321**	**251**	**315**	**247**	**277**

Brazil

Population: 134,000,000. Per capita consumption of paper and board: 27 kg/ 60 lb. Paper and board mills: 45e. Pulp mills: 14 (sulfate: 9; sulfite: 1; mechanical: 1; nonwood, 1).

Paper/board capacity: 4,200,000 tons **Pulp capacity:** 4,000,000 tons

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	3,368	3,614	180	119	596	484
Board	397	440	—	2	63	59
Total	**3,765**	**4,054**	**180**	**121**	**659**	**543**
Chemical woodpulp	3,567	3,331	14	37	960	926
Other pulps	390e	391	—	—	—	8
Total	**3,957e**	**3,722**	**14**	**37**	**960**	**934**

Canada

Population: 25,100,000. Per capita consumption of paper and board: 200 kg/ 441 lb. Paper and board mills: 108. Pulp mills: 34.*

Paper/board capacity: 15,783,000 tons **Pulp capacity:** 23,903,000 tons
Operating rate 1985: 92% **Operating rate 1985:** 88%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	13,481	13,751	382	373	9,673	9,851
Board	745	697	166	176	76	61
Total	**14,226**	**14,448**	**548**	**579**	**9,749**	**9,912**
Chemical woodpulp	11,417	11,456	136	167	6,112	6,502
Other pulps	8,921	8,963	58	56	749	667
Total	**20,338**	**20,413**	**194**	**223**	**6,861**	**7,169**

*Market pulp only.

China, People's Rep. of

Population: 1,046,390,000. Per capita consumption of paper and board: 9 kg (e) /20 lb. Paper and board mills: 1,600e.

Paper/board capacity: 8,867,000 tons **Pulp capacity:** 7,204,000 tons

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	2,357	2,706	73	319	95	95
Packaging paper/board	3,090	4,001	494	378	111	113
Other paper/board	2,113	2,405	115	111	26	19
Total	**7,560**	**9,112**	**682**	**808**	**232**	**227**
Chemical woodpulp	832	938	544	454	—	—
Mechanical pulp	373	403	31	16	—	—
Reed, bamboo, other pulps	4,147	5,024	44	60	—	—
Total	**5,352**	**6,365**	**619**	**530**	**4**	**1**

Finland

Population: 4,902,000. Per capita consumption of paper and board: 189 kg/ 417 lb. Paper and board mills: 46. Pulp mills: 46 (sulfate: 18; semichemical: 3; mechanical: 22).

Paper/board capacity: 8,085,000 tons **Pulp capacity:** 8,990,000 tons

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	6,355	6,476	45	51	5,204	5,411
Board	963	968	16	20	774	756
Total	**7,318**	**7,444**	**61**	**71**	**5,978**	**6,167**
Chemical woodpulp	4,770	4,808	23	15	1,309	1,304
Other pulps	3,261	3,168	26	47	252	230
Total	**8,031**	**7,976**	**49**	**62**	**1,561**	**1,534**

France

Population: 55,300,000. Per capita consumption of paper and board: 119 kg/ 262 lb. Paper and board mills: 155. Pulp mills: 24 (sulfate: 7; sulfite: 3; semichemical: 5; mechanical: 9).

Paper/board capacity: 5,500,000 tons **Pulp capacity:** 2,300,000 tons

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	5,014	4,823	2,053	1,992	1,181	1,162
Board	552	520	529	530	138	147
Total	**5,566**	**5,343**	**2,582**	**2,522**	**1,319**	**1,309**
Chemical woodpulp	1,575	1,498	1,517	1,471	243	303
Other pulps	477	448	108	112	5	8
Total	**2,052**	**1,946**	**1,625**	**1,583**	**248**	**311**

Germany, Fed. Rep.

Population: 61,015,000. Per capita consumption of paper and board: 174 kg/ 384 lb. Paper and board mills: 189. Pulp mills: 37; (sulfite: 10; semichemical: 1; mechanical: 26).

Paper/board capacity: 10,242,000 tons **Pulp capacity:** 2,312,000 tons
Operating rate 1985: 90% **Operating rate 1985:** 95%

(000 metric tons)

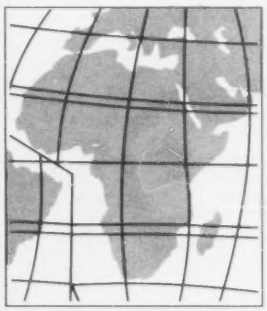
	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	8,052	8,246	4,066	3,947	2,298	2,315
Board	1,093	932	363	386	504	571
Total	**9,145**	**9,178**	**4,429**	**4,333**	**2,802**	**2,886**
Chemical woodpulp	823	818	2,720	2,855	135	116
Other pulps	1,304	1,289	72	74	—	—
Total	**2,127**	**2,107**	**2,792**	**2,929**	**135**	**116**

pacity, should make for a more profitable 1986.

The most noticeable result from 1985 was a 20.5% growth in output in People's Rep. China, which made almost the same amount of paper and board in 1985 as Fed. Rep. Germany. China also recorded a 19% growth in pulp production and a 21% growth in consumption. With Japan, the region's top producer, increasing output by 5.8% to over 20 million tons, Asia led the world in percentage growth.

EFFECTS OF NEW CAPACITY. At the start of the year, the effects of new capacity in pulp and some paper sectors was already evident. The pulp market suffered from overcapacity and insufficient downtime to adequately reduce stocks. The high value of the dollar caused further weakness in most markets. It was not until the end of the year that producers took sufficient downtime to correct the situation.

Paper grades suffered as well. Newsprint prices were depressed in Europe and the U.S. and reached rock bottom in the Far East. In printing grades, a decline in U.S. consumption meant that offshore capacity dedicated to the U.S. market had to be absorbed by other parts of the world. Kraft liner markets remained soft throughout the year, with a slowing world economy and overproduction again revealed as the roots of the problem. There have been many price rises in paper and board grades around the world, and most of *P&P*'s editors and correspondents are optimistic about the latter half of 1986.



AFRICA

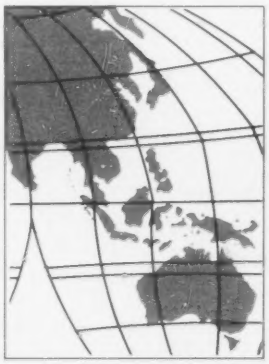
PRODUCTION OF PAPER and board in Africa rose by 7% in 1985 to nearly 2.2 million tons. Pulp output also went up slightly, by an estimated 30,000 tons to 1.5 million tons. Most of the increase was attributable to the expansions completed in late 1984 in Africa's largest producer, South Africa.

The expansion projects, Mondi Paper Co. Ltd.'s 420,000-tpy Richards Bay greenfield pulp and kraft liner mill and Sappi Ltd.'s 440,000-tpy Ngodwana market pulp, kraft liner, and newsprint mill, are now through their startup phases and are earning money in exports.

However, 1985 and the first half of 1986 have seen many problems develop for the South African industry, and these are of a political rather than technical or industrial nature. International reaction to domestic government policies is leading to increasing pressure for trade restrictions against South Africa. Last year, the country exported 420,000 tons of paper and board and about 430,000 tons of pulp, a volume large enough to be significant if international action is concerted. On the side of the exporters is the low international value of the rand against the dollar and other major currencies and the proximity to the fast-growing Asian market. Against them are high interest rates imposed to protect the currency, which have raised the cost of borrowing.

Elsewhere in the continent, output was hit by low reserves of foreign exchange, which made it difficult and sometimes impossible to buy raw materials for papermaking. Servicing loans to international banks has not eased the problem. This illustrated by Nigeria, where a serious drop in oil revenues has led to a scarcity of funds for importing raw materials like pulp. Of the country's three paper mill projects, two have now started up and are enjoying uneven success. Nigerian Paper Mill Ltd. maintained an operating rate of about 60% in 1985, while Nigerian Newsprint Manufacturing started up production based on CTMP in late 1985.

Some bright spots exist. Zimbabwe is considering a new pulp mill based on local wood resources. A study has been completed, and a final decision will be made soon. There is also interest in building a CTMP line in the Congo. It would use local eucalyptus, and the output would be exported to Europe's papermakers.



ASIA/ AUSTRAL-ASIA

OUTPUT OF PAPER and board in Asia in 1985 amounted to 37.5 million tons, up a sharp 7% from 1984. The big four producing nations (Japan, People's Rep. China, Rep. of Korea, and Taiwan) all recorded rises, with People's Rep. China's leap of more than 20% adding 1.5 million tons to Asia's output. Asian pulp output increased 4.3% compared with 1984, to 18.5 million tons. Again, People's Rep. China's production grew by 1 million tons, accounting for most of the increase.

Although the Chinese industry is expanding rapidly, Japan remains the leader of the Asian paper industry and is second only to the U.S. in total output. Paper and board production in Japan rose 5.8% in 1985 to 20.5 million tons—the first time output exceeded the 20-million-ton mark. Casemaking material production was up 14% to 5.8 million tons, with kraft liner rising 17% to 1.6 million tons.

Earlier this year, Japan's Ministry of International Trade & Industry scrapped its capacity-cutting program,

Italy

Population: 57,115,000. Per capita consumption of paper and board: 91 kg/201 lb. Paper and board mills: 360. Pulp mills: 25; sulfite: 2; semichemical: 4; mechanical: 15; nonwood: 4).

Paper/board capacity: 5,200,000 tons **Pulp capacity:** 950,000 tons
Operating rate 1985: 88% **Operating rate 1985:** 75%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	3,757	3,691	1,420	1,461	840	817
Board	957	896	182	155	188	175
Total	**4,714**	**4,587**	**1,602**	**1,616**	**1,028**	**992**
Chemical woodpulp	214	147	1,511	1,645	57	59
Other pulps	599	569	122	124	6	4
Total	**813**	**716**	**1,633**	**1,769**	**63**	**63**

Japan

Population: 121,047,000. Per capita consumption of paper and board: 167 kg/368 lb. Paper and board mills: 489. Pulp mills: 65 (sulfate: 38; sulfite: 4; semichemical: 7; mechanical: 25; nonwood: 4).

Paper/board capacity: 24,043,000 tons **Pulp capacity:** 12,471,000 tons

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	16,540	17,619	650	665	602	608
Board	2,805	2,850	48	38	241	261
Total	**19,345**	**20,469**	**698**	**703**	**843**	**869**
Chemical woodpulp	7,063	7,158	1,509	1,630	30	15
Other pulps	2,064	2,121	655	638	9	5
Total	**9,127**	**9,279**	**2,164**	**2,268**	**39**	**20**

Korea, Rep. of

Population: 41,209,000. Per capita consumption of paper and board: 55 kg/121 lb. Paper and board mills: 150e. Pulp mills: 5 (sulfate: 1; mechanical: 4).

Paper/board capacity: 2,780,000 tons **Pulp capacity:** 426,000 tons
Operating rate 1985: 83% **Operating rate 1985:** 63%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	1,820	1,899	60	87	42	56
Board	387	412	2	2	33	54
Total	**2,207**	**2,311**	**62**	**89**	**75**	**110**
Chemical woodpulp	121	129	519	631	0	0
Other pulps	137	138	72	49	0	0
Total	**258**	**267**	**591**	**680**	**0**	**0**

Mexico

Population: 79,000,000. Per capita consumption of paper and board: 32 g/71 lb. Paper and board mills: 66. Pulp mills: 17 (sulfate: 9; sulfite: 1; mechanical: 1; nonwood: 7).

Paper/board capacity: 3,313,000 tons **Pulp capacity:** 1,034,000 tons
Operating rate 1985: 74% **Operating rate 1985:** 78%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	1,997	2,189	67	97	48	39
Board	243	259	6	8	—	—
Total	**2,240**	**2,448**	**73**	**105**	**48**	**39**
Chemical woodpulp	438	462	211	271	—	—
Other pulps	363	358	16	40	—	—
Total	**801**	**820**	**227**	**311**	**—**	**—**

Netherlands

Population: 14,484,000. Per capita consumption of paper and board: 171 kg/169 lb. Paper and board mills: 33. Pulp mills: 3 (mechanical: 2; nonwood: 1).

Paper/board capacity: 2,111,000 tons **Pulp capacity:** 158,000 tons
Operating rate 1985: 90% **Operating rate 1985:** 87%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	1,299	1,297	1,423	1,427	758	804
Board	586	607	256	286	338	336
Total	**1,885**	**1,904**	**1,679**	**1,713**	**1,096**	**1,140**
Chemical woodpulp	0	0	535	525	7	21
Other pulps	154	138	35	30	0	0
Total	**154**	**138**	**570**	**555**	**7**	**21**

Norway

Population: 4,100,000. Per capita consumption of paper and board: 137 kg/302 lb. Paper and board mills: 23. Pulp mills: 27 (sulfate: 2; sulfite: 4; semichemical: 2; mechanical: 19).

Paper/board capacity: 1,835,000 tons **Pulp capacity:** *2,115,000 tons
Operating rate 1985: 88% **Operating rate 1985:** 87%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	1,529	1,570	211	219	1,193	1,264
Board	33	34	17	20	17	16
Total	**1,562**	**1,604**	**228**	**239**	**1,210**	**1,280**
Chemical woodpulp	656	653	114	105	255	234
Other pulps	1,208	1,325	6	7	304	322
Total	**1,864**	**1,978**	**120**	**112**	**559**	**556**

*Excludes dissolving pulp.

Spain

Population: 38,700,000. Per capita consumption of paper and board: 76 kg/168 lb. Paper and board mills: 177. Pulp mills: 27 (sulfate: 24; sulfite: 1; mechanical: 6; nonwood: 6).

Paper/board capacity: 3,186,000 tons **Pulp capacity:** 1,540,300 tons
Operating rate 1985: 91% **Operating rate 1985:** 93%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	2,625	2,600	422	430	308	316
Board	325	313	26	29	104	113
Total	**2,950**	**2,913**	**448**	**459**	**412**	**429**
Chemical woodpulp	1,184	1,221	288	316	278	332
Other pulps	251	218	7	14	23	5
Total	**1,435**	**1,439**	**295**	**330**	**301**	**337**

Sweden

Population: 8,350,000. Per capita consumption of paper and board: 222 kg/489 lb. Paper and board mills: 56. Pulp mills: 56 (sulfate: 25; sulfite: 8; semichemical: 2; mechanical: 21).

Paper/board capacity: 7,575,000 tons **Pulp capacity:** 9,910,000 tons
Operating rate 1985: 92% **Operating rate 1985:** 92%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	5,702	5,799	171	180	4,315	4,346
Board	1,167	1,204	50	44	878	919
Total	**6,869**	**7,003**	**221**	**224**	**5,193**	**5,265**
Chemical woodpulp	7,029	6,781	128	140	2,791	2,547
Other pulps	2,264	2,342	11	6	420	450
Total	**9,293**	**9,123**	**139**	**146**	**3,211**	**2,997**

which had been in effect since 1983. A number of new expansions are now considered likely. For 1986, the strength of the yen is expected to have a negative effect on Japan's economy, which has been slowing down since mid-1985.

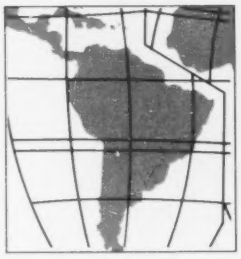
With 1985 production of 9.1 million tons, People's Rep. China ties Fed. Rep. Germany as the world's fifth largest paper and board maker. Output has risen 38% in the last two years, and all indications are that such growth will continue. By the turn of the century, capacity is projected to be around 20 million tpy. Several new and used paper machines are presently being installed in China. At Jilin Paper, in northeastern China, a 60,000-tpy newsprint machine is being installed. The unit is a secondhand paper machine from Sweden.

Late in 1985, People's Rep. China made its first investment in a foreign manufacturing operation with the purchase of the former Morris Paperboard Co. mill in Paterson, N.J. Originally, plans called for much of the tonnage to be shipped to China, but it now appears that production will be sold in the U.S. Chinese mills have also recently begun installing process control equipment on paper machines and in pulp mills. At least six mills have ordered basis weight profile controlling units. Additionally, three pulp mills have added brightness monitoring systems.

Paper and board production in both Rep. Korea and Taiwan rose by 4.6% in 1985. Taiwan topped 2 million tons for the first time as several new paper machines were completed. Pulp capacity also rose as Taiwan Pulp & Paper Corp.'s 130,000-tpy bleached kraft line came onstream. In Rep. Korea, new paper machine startups led to overcapacity in duplex board and newsprint.

In India, Tamil Nadu's 90,000-tpy newsprint and printing/writing paper mill started up early this year, using both bagasse and hardwood as raw material. Numerous small mills started up, although at least five major ones were shut down by financial losses, raw material shortages, and labor problems.

Total paper and board output in Australia was 2.3 million tons in 1985, no change from 1984. New Zealand's paper industry showed strong profit growth in 1985. Winstone Samsung's pulp mill made its first profit, and Tasman Pulp & Paper Co. Ltd.'s profit was vastly improved to NZ$41.8 million ($28 million). Among the other major producers in the country, Carter Holt and NZ Forest Products improved their profits by 51% and 41%, respectively.



LATIN AMERICA

HIGH INFLATION AND A HIGH debt burden remain the major problems for the governments and business communities of Latin America. In 1985, some countries showed signs of overcoming some of their problems while others encountered new difficulties.

Chile showed a balance of payments surplus of $800 million. Hyperinflation was averted in Argentina, although at a cost of a sharp domestic recession. GNP is expected to jump by 9% in 1986, following new government policies in Brazil. And Mexico is facing severe anti-inflation measures that will affect its economy.

Against this background, the continent's pulp and paper industries have fared best where they are geared up for exports and can avoid low demand or anti-inflationary price controls at home. Overall, pulp and paper production was up by 4.5% in 1985 compared with 1984, reaching nearly 9.2 million tons. Brazil was by far the biggest producer, making 4.1 million tons of all grades—an increase of 7.1% over 1984. Indeed, Brazil's domestic market showed a very healthy, growing demand during 1985. Mexico was the next largest producer, with 2.5 million tons, a 9.3% increase from 1984. It also enjoyed success with newsprint exports to the U.S.

In Brazil, pulp production fell by 200,000 tons from its 1984 level of 6.7 million tons, and market pulp production fell as Champion Papel e Celulose SA and Suzano de Papel e Celulose SA paper mills completed major integration projects. Brazil, however, remained the leading producer, with an output of 3.7 million tons, down 5.9% from 1984. Next was Mexico with 820,000 tons of production. Chile followed with 683,000 tons.

In general, 1985 was a good year for Latin American pulp exporters. Chile was able to establish new markets for its radiata pine kraft pulps in the U.S., Asia, and Africa. Brazil's eucalyptus pulp producers have seen an increasing acceptance of their pulps by papermakers, and during the first half of 1986 they have enjoyed a tight market and good pricing in European markets. Brazilian producers are expected to look increasingly for a share of the U.S. pulp market.

Production by continents, world total (000 metric tons)

	PULP					PAPER AND PAPERBOARD				
	1960	1970	1980	1984	1985	1960	1970	1980	1984	1985
North America	32,964	54,912	65,969	70,661	69,563	38,917	58,914	70,225	76,452	75,569
Europe	20,965	34,853	40,235	41,701	41,934	25,634	45,159	59,023	65,400	65,945
Asia/Australasia	5,156	14,268	18,239	19,329	20,663	7,861	20,621	31,962	36,973	40,228
Latin America	821	2,224	5,848	6,716	6,514	1,656	3,712	7,737	8,769	9,161
Africa	124	900	1,502	1,488	1,519	288	892	1,717	2,034	2,172
World total	**60,031**	**107,157**	**131,793**	**139,895**	**140,193**	**74,355**	**129,298**	**170,664**	**189,628**	**193,075**

WORLD PULP, PAPER, AND BOARD INDUSTRY AT A GLANCE

	Population (1,000)	Number of mills		Capacity (1,000 tons)		Per capita	Consumption (1,000 tons)				Production (1,000 tons)			
							P & B		Pulp		P & B		Pulp	
		P & B	Pulp	P & B	Pulp	(lb)	1984	1985	1984	1985	1984	1985	1984	1985
EUROPE														
Belgium	9,858	14	3	920	345	371	1,568	1,660e	631	619e	858	871e	335	321e
Denmark	5,150	6	2	380	115	396	941	926	149	131	352	322	93	88
France	55,300	155	24	5,500	2,300	261	6,809	6,556	3,429	3,218	5,566	5,343	2,052	1,946
Germany, Fed. Rep.	61,015	189	37	10,242	2,312	384	10,772	10,625	4,879	5,016	9,145	9,178	2,127	2,107
Greece	9,700	22	3	430	65	120	497	528	185	163	300	325	45	20
Ireland	3,250	2	0	50	0	189	274	279	10	10	25	26	0	0
Italy	57,115	360	25	5,200	950	201	5,288	5,211	2,383	2,404	4,714	4,587	813	716
Luxemburg	365	0	0	0	0	362	58	60	0	0	0	0	0	0
Netherlands	14,484	33	3	2,111	158	377	2,468	2,477	717	672	1,885	1,904	154	138
United Kingdom	55,950	96	6	3,955	480	307	7,631	7,796	1,820	1,851	3,636	3,766	190	295
EEC	**272,187**	**877**	**103**	**28,788**	**6,725**	**293**	**36,306**	**36,118**	**14,203**	**14,084**	**25,481**	**26,322**	**5,809**	**5,631**
Finland	4,902	46	46	8,085	8,900	417	1,401	1,348	6,519	6,504	7,318	7,444	8,031	7,976
Norway	4,100	23	27	1,835	2,115	303	580	563	1,425	1,534	1,562	1,624	1,864	1,978
Sweden	8,350	56	56	7,575	9,910	518	1,897	1,962	6,221	6,272	6,869	7,003	9,293	9,123
Scandinavia	**17,352**	**125**	**129**	**17,495**	**20,925**	**495**	**3,878**	**3,873**	**14,165**	**14,310**	**15,749**	**16,071**	**19,188**	**19,077**
Austria	7,557	36	16	2,445	1,518	286	938	982	1,233	1,359	1,922	2,127	1,229	1,321
Iceland	241	0	0	0	0	238	22	26	0	0	0	0	0	0
Malta	380	0	0	0	0	52	9	9	0	0	0	0	0	0
Portugal[1]	10,129	95	8	720	1,283	113	510	520	532	426	653	647	1,155	1,388
Spain[1]	38,700	177	27	3,186	1,540	168	2,986	2,943	1,429	1,432	2,950	2,913	1,435	1,439
Switzerland	6,482	29	6	1,055	330	395	1,126	1,161	547	577	986	1,019	302	315
Other W.Europe	**63,489**	**337**	**57**	**7,406**	**4,671**	**196**	**5,591**	**5,641**	**3,741**	**3,794**	**6,511**	**6,706**	**4,121**	**4,413**
Total W.Europe	**353,028**	**1,339**	**289**	**53,689**	**32,321**	**285**	**45,775**	**45,632**	**32,109**	**32,188**	**48,741**	**49,099**	**29,118**	**29,121**
Albania	2,750	4	4	15e	15e	15	19e	19e	10e	10e	10e	10e	10e	10e
Bulgaria	9,000	15	9	450e	260e	120	490e	490e	370e	370e	400e	400e	215e	215e
Czechoslovakia	15,562	49	22	1,370	1,223	181	1,191	1,279	1,037	994	1,263	1,278	1,052	1,116
Germany Dem. Rep.	16,660	21	19	1,500e	750e	182	1,357	1,357	816	820	1,296	1,292	667	678
Hungary	10,600	10	6	550e	150e	138	670	665	301	280	506	494	108	92
Poland	37,345	48	20	1,450	1,000	79	1,268	1,336	1,042	1,025	1,238	1,284	878	868
Romania	23,000	20	12	850e	750e	66	685e	685e	720e	720e	790e	790e	660e	660e
USSR	275,000	84	57	10,750	10,000	74	9,162	9,250e	7,334	7,600e	9,825	9,950e	8,152	8,320e
Yugoslavia	23,123	30	21	1,600	950	115	1,175	1,210	948	865	1,331	1,349	841	854
E. Europe	**413,040**	**281**	**170**	**16,470**	**14,183**	**87**	**16,017**	**16,309**	**12,578**	**12,684**	**16,659**	**16,847**	**12,583**	**12,813**
Total Europe	**766,068**	**1,620**	**459**	**70,159**	**46,504**	**178**	**61,792**	**61,941**	**44,687**	**44,872**	**65,400**	**65,946**	**41,796**	**42,030**
NORTH AMERICA														
Canada	25,100	108	34	15,783	23,903	447	5,025	5,085	13,671	13,473	14,226	14,448	20,338	20,419
United States	239,300	571	225	68,457	53,165	626	68,555	67,966	51,136	49,753	62,226	61,121	50,323	49,144
North America	**264,400**	**679**	**259**	**84,240**	**77,068**	**609**	**73,580**	**73,051**	**64,807**	**63,226**	**76,452**	**75,569**	**70,661**	**69,563**
ASIA														
Afghanistan	16,000	0	0	0	0	0	1e	1e	0	0	0	0	0	0
Bangladesh	100,000	7	8	200	250	2	104	110	200	210	106	115	190	200
Bahrain	400	0	0	0	0	22	4e	4e	0	0	0	0	0	0
Bhutan	1,400	0	0	0	0	2	1e	1e	0	0	0	0	0	0
Brunei	300	0	0	0	0	15	2e	2e	0	0	0	0	0	0
Burma	34,000	4	2	-	-	3	40e	40e	15e	15e	10e	10e	15e	15e
China, Peo. Rep.	1,046,390	1,600	8,867	7,204	6,653	21	8,010	9,693	5,967	6,894	7,560	9,112	5,352	6,365
Cyprus	700	1	0	10	0	183	53e	58e	8e	8e	8e	8e	0	0
Hong Kong	5,200	3	0	40	0	356	785e	840e	5e	5e	35e	40e	0	0
India	700,000	262	-	2,458	1,450	6	1,574	1,740	1,050e	1,150e	1,367	1,590	1050e	1050e
Indonesia	150,000	35	16	877e	300e	10	614e	700e	450e	520e	380e	480e	200e	250e
Iran	40,000	17	2	320e	250e	16	300e	285e	90e	70e	100e	75e	50e	40e
Iraq	13,000	2	2	144e	90e	12	70e	70e	40e	40e	30e	30e	30e	30e
Israel	4,500	5	0	160	0	175	359	358	0	0	154	147	0	0
Japan	121,047	489	65	24,043	12,471	370	19,200	20,303	11,252	11,527	19,345	20,469	9,127	9,279
Jordan	3,500	1	0	18	0	50	75	80	3	3	8	15	0	0
Kampuchea	9,000	0	0	0	0	2	6e	6e	0	0	0	0	0	0
Korea, Peo. Rep.	20,000	6	2	100e	80e	10	90e	90e	50e	50e	80e	80e	50e	50e
Korea, Rep. of	41,209	150	5	2,780	426	123	2,194	2,290	849	947	2,207	2,311	258	267
Kuwait	1,695	1	0	25	0	42	32e	32e	0	0	20e	20e	0	0
Laos	4,000	0	0	0	0	1	1e	1e	0	0	0	0	0	0
Lebanon	3,300	3	0	50e	0	70	110e	105e	5e	5e	45e	45e	0	0
Macao	300	0	0	0	0	73	10e	10e	0	0	0	0	0	0
Malaysia	11,500	13	1	100e	60e	73	375e	382e	45e	52e	68e	73e	40e	45e
Mongolia	1,750	1	1	10e	10e	25	20e	20e	5e	5e	5e	5e	5e	5e
Nepal	16,300	3	2	17	20	1	7	10	7e	10e	2	0	0e	0e
Oman	1,000	0	0	0	0	11	5e	5e	0	0	0	0	0	0
Pakistan	88,000	15	-	160	40	8	248	315	0	0	105	119	110	115e
Philippines	55,000	25	9	549	303	15	399	364	222	134	252	218	180	99
Qatar	300	0	0	0	0	37	5e	5e	0	0	0	0	0	0
Saudi Arabia	9,500	0	0	0	0	23	100e	100e	0	0	0	0	0	0
Singapore	2,500	2	0	20	0	256	300e	290e	11e	15e	10e	10e	0	0
Sri Lanka	15,000	2	2	40e	25e	10	70e	70e	28e	26e	25e	25e	21e	21e
Syria	9,000	3	0	35e	0	20	80e	80e	10e	10e	5e	5e	0	0
Taiwan	19,248	151	3	2,700	500	236	1,982	2,063	461	541	1,929	2,018	325	350
Thailand	50,000	33	5	450e	110e	22	490e	505e	160e	170e	329e	350e	40e	50e
Turkey	48,000	36	17	600e	540e	24	523	520e	432	435e	488	490e	377	380e
United Arab Emirates	1,000	0	0	0	0	13	6e	6e	0	0	0	0	0	0
Vietnam	60,000	30e	30e	120e	90e	2	55e	60e	45e	50e	50e	55e	15e	20e
Yemen Arab Rep.	5,500	0	0	0	0	1	2e	2e	0	0	0	0	0	0
Yemen Dem. Rep.	2,000	0	0	0	0	2	2e	2e	0	0	0	0	0	0
Asia	**2,711,539**	**2,900**	**9,041**	**43,230**	**17,015**	**34**	**38,277**	**41,618**	**21,410**	**22,892**	**34,723**	**37,915**	**17,435**	**18,631**

All figures are metric tons. e = Estimate.

1. Since Spain and Portugal did not accede to the EEC until Jan. 1, 1986, they are included in Other Europe statistics.

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	Population (1,000)	Number of mills P & B	Number of mills Pulp	Capacity (1,000 tons) P & B	Capacity (1,000 tons) Pulp	Per capita (lb)	Consumption (1,000 tons) P & B 1984	Consumption (1,000 tons) P & B 1985	Consumption (1,000 tons) Pulp 1984	Consumption (1,000 tons) Pulp 1985	Production (1,000 tons) P & B 1984	Production (1,000 tons) P & B 1985	Production (1,000 tons) Pulp 1984	Production (1,000 tons) Pulp 1985
LATIN AMERICA														
Argentina	30,000	86	20	1,290	840	64	960	871	647	633	943	867	664	683
Bahamas	200	0	0	0	0	165	10	15	0	0	0	0	0	0
Barbados	300	0	0	0	0	51	7e	7e	0	0	0	0	0	0
Belize	163	0	0	0	0	27	3	2	0	0	0	0	0	0
Bolivia	5,600	9	5	62e	32e	39	99	99	48	48	59	59	26	26
Brazil	134,000	45	14	4,200	4,000	60	3,286	3,632	3,011	2,825	3,765	4,054	3,957	3,722
Chile	12,000	18	7	433	900	54	839	294	346	334	375	370	839	837
Colombia	28,000	26	6	530	250	35	451	451e	235	235e	365	365e	189	189e
Costa Rica	2,416	2	1	18	25	116	120	127	18	17	14	12	12	12
Cuba	10,000	9	3	150e	60e	51	23"e	232e	80e	80e	73e	73e	32e	32e
Dominican Rep.	5,551	2	0	45	0	26	65e	65e	4e	4e	9e	9e	0	0
Ecuador	9,000	9	5	65	25	28	116	113	47	47	72	68	25	25
El Salvador	5,500	3	0	50	0	11	26	28	0	0	27	28	0	0
Guatemala	7,500	4	0	50	0	10	35	34	5	4	35	34	0	0
Guyana	900	0	0	0	0	17	7e	7e	0	0	0	0	0	0
Haiti	5,800	0	0	0	0	2	6e	6e	0	0	0	0	0	0
Honduras	4,000	0	0	0	0	22	98	40	0	0	0	0	0	0
Jamaica	2,226	1	0	5	0	15	15e	15e	4e	4e	4e	4e	0	0
Mexico	79,000	66	17	3,313	1,034	70	2,265	2,514	1,028	1,131	2,240	2,448	801	820
Neth. Antilles	200	0	0	0	0	33	3	3	0	0	0	0	0	0
Nicaragua	2,000	0	0	0	0	26	20	24	0	0	0	0	0	0
Panama	2,200	3	0	30	0	80	80	80	0	0	25	28	0	0
Paraguay	3,200	3	-	25e	25e	18	26e	26e	15e	15e	13e	13e	15e	15e
Peru	19,000	15	4	427e	311e	21	183e	183e	80e	80e	138e	138e	59e	59e
Surinam	390	0	0	0	0	45	8	8	0	0	0	0	0	0
Trinidad/Tobago	1,100	0	0	0	0	20	12e	10e	0	0	0	0	0	0
Uruguay	3,000	5	3	60	30	32	58	44	38	34	54	41	30	26
Venezuela	17,500	10	3	790	174	91	759	724	292	281	558	550	67	68
Latin America	**390,746**	**316**	**88**	**11,543**	**7,706**	**54**	**9,789**	**9,654**	**5,898**	**5,772**	**8,769**	**9,161**	**6,716**	**6,514**
AUSTRALASIA														
Australia	15,749	17	18	1,675	1,158	313	2,203	2,238	1,045	1,053	1,555	1,543	832	887
Fiji	700	0	0	0	0	32	10e	10e	0	0	0	0	0	0
New Zealand	3,265	6	6	860	1,492	400	439	593	587	727	695	770	1,062	1,145
Papua New Guinea	3,300	0	0	0	0	7	10	10e	0	0	0	0	0	0
Samoa	200	0	0	0	0	11	1e	1e	0	0	0	0	0	0
Australasia	**23,214**	**23**	**24**	**2,535**	**2,650**	**271**	**2,663**	**$2,852g**	**1,632**	**1,780**	**2,250**	**2,313**	**1,894**	**2,032**
AFRICA														
Algeria	20,000	6	3	35	25	18	166	166e	90	90e	86	86e	30	30e
Angola	7,200	2	1	30e	45e	5	16	16e	37	37e	15	15e	35	35e
Benin	3,700	0	0	0	0	2	3	3e	0	0	0	0	0	0
Botswana	900	0	0	0	0	2	1	1e	0	0	0	0	0	0
Burkina Faso	7,000	0	0	0	0	0	1	1e	0	0	0	0	0	0
Burundi	4,600	0	0	0	0	2	4	4e	0	0	0	0	0	0
Cameroon	8,600	0	0	0	0	8	30	30	0	0	0	0	0	0
Central African Rep.	2,300	0	0	0	0	1	1	1e	0	0	0	0	0	0
Chad	4,600	0	0	0	0	0	1	1e	0	0	0	0	0	0
Congo	1,600	0	0	0	0	1	1	1e	0	0	0	0	0	0
Egypt	49,000	16	3	180	60	20	473	449e	65	65e	149	149e	42	42e
Ethiopia	42,000	1	0	12	0	0	9	9	6	8	9	9	0	0
Gabon	500	0	0	0	0	7	2	2e	0	0	0	0	0	0
Gambia	600	0	0	0	0	7	2	2e	0	0	0	0	0	0
Ghana	12,000	0	0	0	0	1	4	5e	0	0	0	0	0	0
Guinea	5,400	0	0	0	0	2	4	4e	0	0	0	0	0	0
Ivory Coast	8,200	0	0	0	0	9	35	35e	0	0	0	0	0	0
Kenya	17,000	5	1	80	60	15	118	118e	57	57e	118	118e	53	53e
Lesotho	1,400	0	0	0	0	2	1	1e	0	0	0	0	0	0
Liberia	1,900	0	0	0	0	1	1	1e	0	0	0	0	0	0
Libya	3,000	20	0	10	0	15	21	21e	6	6e	6	6e	0	0
Madagascar	10,000	2	2	27	7	2	10	10	11	9	10	10	7	5
Malawi	6,100	0	0	0	0	4	12	12e	0	0	0	0	0	0
Mali	7,000	0	0	0	0	0	1	1e	0	0	0	0	0	0
Mauritania	1,700	0	0	0	0	5	4	4e	0	0	0	0	0	0
Mauritius	1,000	0	0	0	0	15	7	7e	0	0	0	0	0	0
Morocco	23,100	8	1	130	100	17	189	178	43	48	112	107	83	81
Mozambique	10,500	2	0	10	0	5	23	23e	3	3e	3	3e	0	0
Niger	5,500	0	0	0	0	0	1	1e	0	0	0	0	0	0
Nigeria	100,000	2	-	80	0	6	222	247	10	35	10	35	1	7
Rwanda	5,100	0	0	0	0	1	2	2e	0	0	0	0	0	0
Senegal	5,800	0	0	0	0	7	19	19	1	1	0	0	0	0
Sierra Leone	3,600	0	0	0	0	1	2	2e	0	0	0	0	0	0
Somalia	3,800	0	0	0	0	1	2	2e	0	0	0	0	0	0
South Africa	25,000	17	10	1,750e	1,250e	114	1,407	1,293	860	825e	1,398	1,510	1,000e	1,030e
Sudan	21,500	1	0	6	0	4	37	37	0	0	3	3	0	0
Swaziland	700	0	1	0	180	19	6	6e	0	0	0	0	178	174
Tanzania	17,750	2	1	65	50	4	28	28e	3	3e	3	3e	0	0
Togo	2,700	0	0	0	0	5	6	6e	0	0	0	0	0	0
Tunisia	6,500	5	1	30	25	25	73	73e	40	40e	28	28e	20	20e
Uganda	13,500	1	0	5	0	1	8	8e	0	0	0	0	0	0
Zaire	29,000	1	0	4	0	1	10	10e	2	2e	2	2e	0	0
Zambia	6,250	1	2	15	15	11	32	32e	15	15e	12	12e	10	10e
Zimbabwe	8,000	3	2	85	40	22	75	80	49	57	67	73	29	32
Africa	**515,700**	**95**	**30**	**2,554**	**1,857**	**13**	**3,070**	**2,952**	**1,309**	**1,303**	**2,034**	**2,172**	**1,488**	**1,519**
TOTAL WORLD	**4,671,667**	**5,633**	**1,034**	**214,261**	**152,800**	**91**	**189,166**	**192,058**	**139,736**	**139,835**	**189,628**	**193,076**	**139,895**	**140,193**

TOP 20 PRODUCING NATIONS

Taiwan

Population: 19,248,000. Per capita consumption of paper and board: 107 kg/236 lb. Paper and board mills: 151. Pulp mills:* 3 (sulfate: 2; nonwood: 1).

Paper/board capacity: 2,700,000 tons **Pulp capacity:** 500,000 tons
Operating rate 1985: 75%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	1,481	1,560	149	138	66	45
Board	448	458	0	0	30	48
Total	**1,929**	**2,018**	**149**	**138**	**96**	**93**
Chemical woodpulp	317	342	152	247	32	75
Other pulps	8	8	17	20	1	1
Total	**325**	**350**	**169**	**267**	**33**	**76**

*Market pulp only.

United Kingdom

Population: 55,950,000. Per capita consumption of paper and board: 139 kg/306. Paper and board mills: 96. Pulp mills: 6 (semichemical: 2; mechanical: 2; nonwood: 2).

Paper/board capacity: 3,955,000 tons **Pulp capacity:** 480,000 tons
Operating rate 1985: 93% **Operating rate 1985:** 64%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	2,594	2,697	3,705	3,746	283	321
Board	1,042	1,069	823	858	250	253
Total	**3,636**	**3,766**	**4,528**	**4604**	**533**	**574**
Chemical woodpulp	0	0	1,383	1,339	3	1
Other pulps	—	—	253	220	3	2
Total	**190**	**295**	**1,636**	**1,559**	**6**	**3**

United States

Population: 239,300,000. Per capita consumption of paper and board: 282 kg/622 lb. Paper and board mills: 571. Pulp mills: 225 (sulfate: 224; sulfite: 18; semichemical: 38; mechanical: 45).

Paper/board capacity: 68,457,000 tons **Pulp capacity:** 53,165,000 tons
Operating rate 1985: 90% **Operating rate 1985:** 86%

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	52,112	51,067	9,686	9,992	2,667	2,420
Board	10,114	10,054	62	62	752	789
Total	**62,226**	**61,121**	**9,748**	**10,054**	**3,419**	**3,209**
Chemical woodpulp	44,234	43,316	3,693	3,791	2,716	2,868
Other pulps	6,089	5,828	380	260	544	574
Total	**50,323**	**49,144**	**4,073**	**4051**	**3,260**	**3,442**

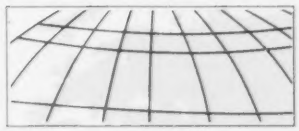
U.S.S.R.

Population: 275,000,000. Per capita consumption of paper and board: 34 kg (e) /75 lb. Paper and board mills: 84. Pulp mills: 57.

Paper/board capacity: 10,750,000e tons **Pulp capacity:** 10,000,000e tons

(000 metric tons)

	Production		Imports		Exports	
	1984	1985	1984	1985	1984	1985
Paper	5,860	5,960	567	534	1,024	1,030
Board	3,965	3,990	166	166	372	370
Total	**9,825**	**9,950**	**733**	**700**	**1,396**	**1,400**
Chemical woodpulp	6,602e	6,720	192	350	1,010	1,070
Other pulps	1,550e	1,600	—	—	—	—
Total	**8,152**	**8,320**	**192**	**350**	**1,010**	**1,070**



EUROPE

THE UNCERTAINTY THAT is affecting major European markets for most of 1985 resulted in production totals that showed only marginal changes from 1984. No great increases or dramatic declines in paper, board, or pulp output occurred. As 1984 was considered a boom year with record-high production, the 1985 result was certainly not disastrous—hopefully it was only a pause before the upward climb continues.

But the small production differences show that the EEC nations fared slightly worse than in the previous year. Paper and board production fell 0.6%, and pulp output fell 3%. The Nordic nations, whose main market is the EEC, fared rather better. Paper and board production was up 2%, but pulp output dropped 0.6%.

Of the main producing EEC nations, two made less paper and board than in 1984 (France, -4%; Italy, -2.7%). One made about the same amount (Fed. Rep. Germany, +0.4%). Low GNP growth and buyers using inventories were two main reasons for France's drop in ouput, while Italy suffered from weaker export markets. But for Fed. Rep. Germany, exports were the real driving force for the industry. Reports from all three countries indicated an improvement in profits and cautious optimism for 1986.

Although Norway set a new output record, the Nordic nations were affected by weaker pulp markets. Prices fell 30% in 1985. Swedish and Finnish pulp exports together dropped 5% from 1984, although paper and board exports, mostly newsprint, wood-containing printing/writing paper, and kraft liner, were up 2.3%. Finland's rationalization program and its move to higher-value products are designed to make it more competitive in international markets. Sweden continues its heavy investment program.

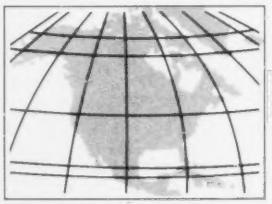
Of the rest, Austria—dependent on EEC markets—enjoyed a 10.7% rise in paper and board production to top the 2-million-ton mark for the first time. And Switzerland just broke the 1-million-ton barrier with a 3.3% increase. Output dropped marginally in both Spain and Portugal; together they made 3.56 million tons of paper and board, down 1%. Portugal increased its pulp output significantly, by 15.8%, producing over 1 million tons of market pulp for the first time.

Eastern European paper output rose 3%, and pulp rose 1.8%. But this is largely due to an estimated figure (based on real 1984 totals) for the dominant producer—the U.S.S.R. Most of the rest had very small increases in paper and board output; some were affected by shortages of chemicals and spare parts. But overall, the continuing trend throughout eastern Europe is toward modernization, increasing capacity, and higher exports in the future.

There were two noticeable points on a 1985 break-

down by grade: the EEC increased its newsprint output by 100,000 tons, mostly due to the rapid rise in U.K. production; and the Nordic nations made 5% more printing/writing paper than in 1984 and 28.5% more than 1983. In contrast, the EEC made 1.5% less than 1984 and just 8.8% more than 1983.

Overall, Europe's paper and board output increased just 0.8% to 65.9 million tons, while pulp production rose 0.6% to 41.9 million tons. Although 1985 brought its weak quarters and its uncertainties, most European mills seem optimistic about their prospects in 1986.



NORTH AMERICA

TOTAL PAPER AND BOARD production in North America in 1985 was 75.6 million tons, 1.3% below the all-time record of 76.6 million tons set in 1984. The fall was due to lower output in the U.S. Canadian tonnage increased 222,000 tons, or by 1.6% to 1.4 million tons.

U.S. output ended the year at 61.1 million tons, down 1.8%. The year was somewhat disappointing for the industry as the U.S. economy as a whole slowed down from the previous year's pace. In addition, the high value of the dollar gave domestic producers trouble by attracting imports and slowing exports.

Imports of coated paper rose 16% in 1985, while overseas shipments of kraft liner, an important export grade, fell by 13%. The drop in kraft liner exports caused production of that grade to drop by 5% to 14 million tons. Market pulp exports appeared unaffected by the strong dollar, rising 8% to 3.4 million tons. Total pulp production amounted to 49.1 million tons, down 2%.

U.S. newsprint production was basically on the same level as the previous year at 5 million tons. Imports, however, rose to 7.7 million tons, up 7.6%.

In Canada, an 11% increase in printing/writing and sanitary paper production led the overall rise in total output for the year. Printing/writing paper totaled 2.1 million tons, up 10%. Tissue output amounted to 453,000 tons, rising 13% from 1984.

Canadian newsprint production was stable at 9 million tons as mills ran at a 92% operating rate. Total pulp production rose slightly to 20.4 million tons because the strike in British Columbian mills in 1984 was offset by downtime in 1985. Market pulp output rose by 3% to 8 million tons. Exports jumped 4.4% to 7.2 million tons.

For the first half of 1986, U.S. production was running at a 63-million-tpy pace, which would be 2% above the previous production record set in 1984. In Canada, total shipments are projected to rise 2.5% to 22.2 million tons in 1986. ■

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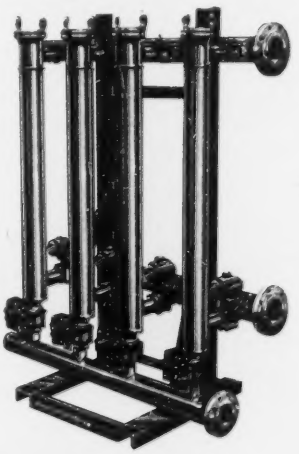

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U.S. AND JAPANESE PAPER INDUSTRY LEADERS DISCUSS TRADE DIFFERENCES

Joint Washington, D.C., meeting between chief executives of world's two largest paper industries helps promote better understanding

By WILLARD E. MIES, Executive News Editor

Not all disagreements on trade issues were resolved at a meeting sponsored by the American Paper Institute and Japan Paper Assn. Held Apr. 8-10, 1986, in Washington, D.C., the meeting brought together the leaders of the world's two largest paper industries.

U.S. paper industry executives complained that tariff and particularly nontariff "systemic" barriers limit the ability of U.S. producers to increase their exports to the Japanese market despite their significant cost advantage. Such "invisible" barriers to entry are deeply rooted in Japanese society and business practices, they said. Japanese leaders responded that not only price but quality, service, and a long-term commitment are required to succeed in their home market. Only a few U.S. companies, they said, have shown such patience.

But the wide-ranging discussion between chief executives of both countries—which followed a similar meeting in Tokyo two years ago—resulted in "some progress in better communication and understanding," according to Dr. Irene Meister, API's vice president-international. The meeting also was attended by government officials representing both countries.

BARRIERS STILL EXIST. The U.S. paper industry seeks to substantially increase its exports to Japan and wants to work with Japanese customers to establish long-term supply relationships, said T. Marshall Hahn Jr., chairman and CEO of Georgia-Pacific Corp.

"Despite these efforts, U.S. import penetration remains extremely low in Japan compared with other markets and, for some grades, it has actually fallen," Hahn said (Table 1). Imports of U.S. kraft linerboard, for example, represented 5.4% of Japanese consumption in 1983 but fell to 4.7% in 1984 and may have dropped below 4% in 1985. Imports of U.S. printing and writing papers have remained "so insignificant that percentage figures on penetration are meaningless."

Hahn said that the U.S. paper industry believes that the reason for the low penetration of U.S. pulp and paper in Japan lies with "Japan's barriers to imports, both tariff and invisible barriers that are rooted in the Japanese business system."

While welcoming the December 1985 reduction in tariffs on U.S. paper products in Japan, the U.S. paper industry believes that tariffs between the "world's two largest paper producing and consuming nations should be equalized," Hahn said. "The area of nontariff invisible barriers, however, remains the single most important area that must be addressed. The U.S. paper industry believes that a wide range of commercial, business, and funding practices in Japan continue to restrain imports," Hahn noted. He cited the following examples:

- The operation of the Structural Improvement Law which, by permitting cartels, has not eliminated excess inefficient capacity

TABLE 1: **Exports of selected U.S. paper industry products to Japan (000 metric tons).**

	1985	1984	1979
Newsprint	181	183	127
Printing/writing	1	1	1
Packaging/industrial	12	12	9
Linerboard	150	165	126
Bleached board	171	167	129
Total paper & board*	**526**	**539**	**404**
Woodpulp	753	738	616
Wastepaper	301	309	84

*Total includes minor grade categories not shown above.
Source: American Paper Institute from U.S. Bureau of Census.

TABLE 2: **Reductions of Japanese tariffs on paper and paperboard exports, 1984-88.**

Imported items	4/84	4/85	1/86	4/86	4/87	4/88
Newsprint	4.0	3.9	3.1	—	—	—
Kraft paper	9.3	8.5	6.8	5.7	4.6	3.5
Kraft liner (300 g and lower)	9.3	8.5	6.8	5.7	4.6	3.5
Bleached board	5.9	5.0	4.0	3.5	3.0	2.5
Milk carton	5.1	4.8	3.8	2.5	1.3	0.0

• Financing practices that lead to an artificially depressed market for such products as containerboard by helping to maintain noncompetitive enterprises

• Interlocking relationships between producers, distributors, and financial institutions which, although legal in Japan, perpetuate the "system" that clearly favors domestic producers over imports

• The absence of companies devoted to imports of pulp and paper, leaving imports to distributors for whom domestic sales are more important than imports.

TARIFFS HAVE COME DOWN. Trade relations between the Japanese and U.S. paper industries should be helped by recent large Japanese tariff reductions, the dramatic appreciation of the yen, and the improving outlook for the U.S. economy, according to Jiro Kawake, president of Oji Paper Co. Ltd.

As the result of the recent Market Oriented Sector Selective (MOSS) talks between the U.S. and Japanese governments, Japanese import tariffs have been reduced significantly on paper products and now "can stand comparison with those of Canada and the EC." The tariff on kraft liner (under 300 g), for example, was reduced to 6.8% on Jan. 1 and reduced again to 5.7% Apr. 1. It is scheduled to decline to 3.5% by 1988 (Table 2).

Oji's president denied that serious nontariff barriers to entry of U.S. paper and paperboard into Japan exist. The structural improvement program for the Japanese containerboard industry is a matter of national industrial policy and is not intended to restrict imports. And Kawake denied that Japanese paper manufacturers' partial ownership control of distributors is not an obstacle to entering the Japanese market.

Kawake noted that between 1979 and 1984, U.S. paper and paperboard exports rose from 3.14 million tons to 3.82 million tons—an increase of 677,000 tons. Exports to Japan during this period rose from 222,000 tons to 530,000 tons—an increase of 377,000 tons. Exports to Japan, therefore, accounted for nearly half of the rise. During this same period, exports to Europe fell from 937,000 to 897,000 tons—a 40,000-ton decrease.

STRICT QUALITY REQUIREMENTS. To enter the Japanese market, exporters must not only provide products at a favorable price but must also provide products with a quality level and such service as the customer requests, Kawake said. "Since the level of requirements by Japanese customers is quite severe, long-term, patient efforts are necessary until the customer's satisfaction is gained."

He noted that in the Japanese newsprint business, the paper break ratio at Japanese publishers' press rooms is about 0.1%, while in North America it is around 3%. In addition, Japanese publishers only keep available inventory for the day, so suppliers must deliver newsprint rolls twice a day for morning and evening editions.

Similar quality and service are also required by the Japanese containerboard market, according to Hisashi Tahara, president of Honshu Paper Co. Ltd. During the past decade, the Japanese containerboard industry has trended toward lighter basis weight and lower-grade containerboard (containing more wastepaper). Several new grades of linerboard have developed in addition to pure kraft linerboard (K' liner and K" liner) and a second grade of C jute liner (C' jute). Last year, K" and C' became the major grades in Japan.

In Japan, containerboard is sold on the basis of calculated weight:

$$\text{Roll weight} = \text{nominal basis weight} \times \text{length of roll} \times \text{width of roll}$$

rather than on actual weight. Japanese Industrial Standards (revised in 1985) specify grade, basis weight, and strength requirements. Delivery requirements are stringent, and the size of individual orders has been getting smaller (more than half are less than 500 m or 1,640 ft on the corrugator). A few U.S. linerboard exporters are trying to meet these requirements of the Japanese market, but most are not, Tahara said.

COMPLEX DISTRIBUTION SYSTEM. Japanese paper and paperboard distribution is managed by three organizations—dairiten, merchants, and sogo-shosha. Dairiten are distributors under contract to manufacturers that carry inventories and sell large volumes of merchandise to either end users or merchants. Merchants usually purchase through dairiten as secondary wholesalers and resell to small-to-medium-size customers. Sogo-shosha (trading houses) became involved in the distribution system starting with paperboard mills in the 1960s and have a similar function to that of dairiten (Figure 1).

In 1984, dairiten distributed 82% of the paper and 64% of the paperboard sold in Japan, while sogo-shosha sold 11% and 29%, respectively, according to Akira Seki, president of Japan Pulp & Paper Co. Ltd. There are about 115 dairiten and 680 paper merchants that belong to various trade associations and provide marketing, distribution, planning, and financial services (Table 3 and Figure 2).

Dairiten usually represent a number of manufacturers, including offshore mills. Seki noted that there has been U.S. criticism that the Japanese distribution system

FIGURE 1: **Distribution flow of paper and paperboard in Japan.**

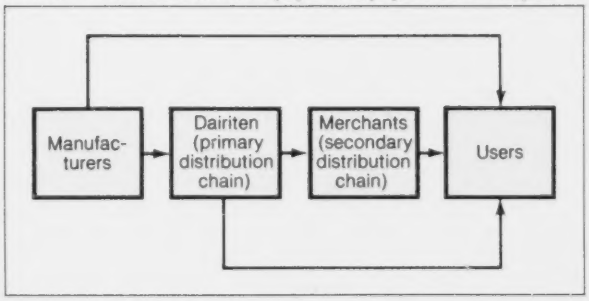
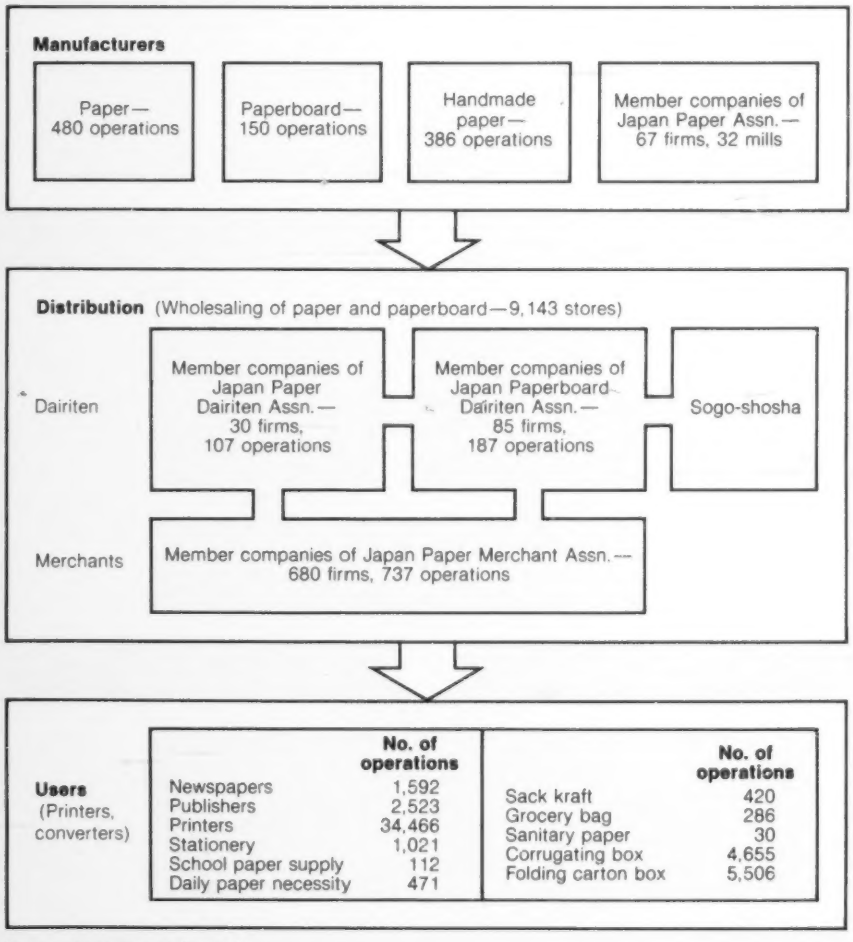


TABLE 3: **Japanese paper industry distribution channels by grades and users.**

Pattern of distribution	Major grades	Users
Manufacturer→dairiten →merchant→user	Printing paper Wrapping paper Folding carton boxboard	Small-to-medium-size printers, publishers, folding carton boxboard manufacturers (great number of users who demand small lots and number of standards)
Manufacturer→dairiten →user		Major printers, publishers, folding carton box manufacturers, government agencies (purchasing large volumes in several simple standards)
	Sack kraft paper Containerboard	Bag and corrugating box manufacturers (purchasing large volumes in simple standards)
Manufacturer→user (Dairiten settle) accounts)	Newsprint and some containerboard—part of of business with government agencies	Newspaper publishers in general receive paper every day in the necessary quantity for the day or the following day

Source: Japan Pulp & Paper Co.

FIGURE 2: **Structure of Japanese paper and paperboard manufacturers, distributors, and users.**


Manufacturers
Paper— 480 operations
Paperboard— 150 operations
Handmade paper— 386 operations
Member companies of Japan Paper Assn.— 67 firms, 32 mills
Distribution (Wholesaling of paper and paperboard—9,143 stores)
Dairiten
Member companies of Japan Paper Dairiten Assn.— 30 firms, 107 operations
Member companies of Japan Paperboard Dairiten Assn.— 85 firms, 187 operations
Sogo-shosha
Merchants
Member companies of Japan Paper Merchant Assn.— 680 firms, 737 operations
Users (Printers, converters)
No. of operations
Newspapers 1,592
Publishers 2,523
Printers 34,466
Stationery 1,021
School paper supply 112
Daily paper necessity 471
No. of operations
Sack kraft 420
Grocery bag 286
Sanitary paper 30
Corrugating box 4,655
Folding carton box 5,506

Source: Japan Pulp & Paper Co.

prevents offshore products that may have an advantage in price from easily entering the Japanese market. Nevertheless, he said that the existing distribution system has proven to be efficient and should not prevent entry of imports.

Another complaint has been that interlocking ownership interests between manufacturers and distributors have made it difficult for U.S. forest products to enter the Japanese market. Although it is true that some manufacturers own substantial stock in dairiten, competing producers may hold interests as well, "which keeps a balance of power in management," Seki said.

SLOWER GROWTH IN DEMAND. The Japanese paper industry will be facing slower demand growth and increased import competition because of the recent sharp rise in the value of the yen and reduction in tariff levels, according to the Japanese chief executives. To survive, Japanese paper companies must continue to rationalize their operations, increase productivity, strengthen their finances, step up research, and expand in size through mergers and acquisitions, noted Tadami Nasu, president of Sanyo-Kokusaku Pulp Co. Ltd.

Japanese companies already have been taking such actions in response to the oil shocks of 1973 and 1979, which resulted in a slowdown in economic growth and paper consumption. Growth in Japanese paper consumption dropped from a rapid 10.6%/year pace in the 1960s to only a 3.2% rate in the 1970s. This reflected a trend to lighter basis weights, increased competition from plastics, and efforts by customers to reduce paper consumption, according to Minoru Ishigami, president of Jujo Paper Co. Ltd.

For the 1985-90 period, paper and paperboard demand is projected to grow at only a 2.4% annual rate compared with a 4% rate for real GNP, according to a Japan Paper Assn. forecast prepared for the joint meeting (Table 4). Consumption is expected to reach almost 23 million tons in 1990, up from 20.4 million tons in 1985. Here is the outlook for major grades:

• **Newsprint.** Consumption has been growing at only a 1%/year rate since 1980. This unusually slow pace mainly reflects a trend to reduced basis weights by Japanese publishers. In 1980, 91.2% of total newsprint production was 49 g/m² (30 lb). By 1985, 46 g/m² (28 lb) accounted for 88% of production, with 49 g/m² down to only 10.9%. On an area basis, growth during the five-year period was 1.9%/year. Although even lighter newsprint is being developed, 28 lb will probably remain dominant until 1990. Newsprint demand is projected to grow at an average annual rate of 1.4%, reaching 2.89 million metric tons in 1990.

• **Printing and communication paper.** Demand is expected to grow at a 3.0% rate over the next five years and reach 6.9 million tons in 1990, spurred by the growth of office automation equipment. Some shift in consumption is expected from wood-free to groundwood papers and from uncoated to coated papers.

• **Wrapping paper.** Wrapping paper has been hard hit by changes in the transportation system and competition from plastic products. After declining at a 1.8% average annual rate during the 1970s, the worst may be over. Demand is expected to increase at a 1.0% pace over the next five years, reaching 1.18 million tons in 1990.

• **Containerboard.** After growing at an annual rate of 5% during the 1970s, consumption of containerboard slowed to a 3% pace in the 1980-85 period. Growth in demand for 1985-90 is expected to be in the 2% to 3% range and should reach 6.7 million tons in 1990. Some end uses that previously showed the fastest growth, such as electronics and food, are being hurt by cooling export business and the near completion of a shift from wooden cases to corrugated boxes in agriculture.

• **Boxboard.** Demand is expected to grow at a 1.8% annual rate during the 1985-90 period compared with a 2.3% rate from 1980-83 and a 3.1% rate for the previous five years, reflecting slower economic growth and efforts by customers to save on packaging costs. At the same time, however, customers have been upgrading board quality for better graphics.

TABLE 4: **Projected Japanese paper and paperboard consumption by major grades (000 metric tons).**

					Average annual % change	
Grade	**1970**	**1980**	**1985p**	**1990e**	**1980/70**	**1990/80**
Newsprint	1,899	2,565	2,693	2,889	3.1%	1.2%
Information/ communication papers	2,825	4,709	5,960	6,912	5.2	3.9
Wrapping paper	1,191	999	1,124	1,182	−1.8	1.7
Other paper	943	1,528	2,005	2,316	4.9	42
Total paper	6,858	9,801	11,782	13,299	3.6	3.1
Containerboard	3,564	4,749	5,997	6,728	2.9	3.5
Folding carton	1,336	1,444	1,616	1,766	0.8	2.0
Other board	558	812	1,003	1,181	3.8	3.8
Total paperboard	5,458	7,005	8,616	9,675	2.5	3.3
Total paper and paperboard	**12,316**	**16,806**	**20,398**	**22,974**	**3.2**	**3.2**

Source: Japan Paper Assn.

RESTRUCTURING. Because of the slower growth, the Japanese paper industry began a major restructuring program based on the "Temporary Law for Structural Improvement of Specific Industries." The program has been in effect since December 1983 for paper grades (excluding newsprint and household tissue), and since August 1984 for containerboard.

Under these programs, the industry has tried to limit or ban new

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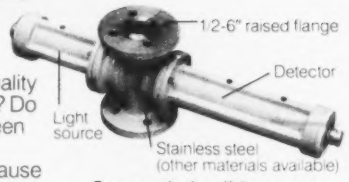

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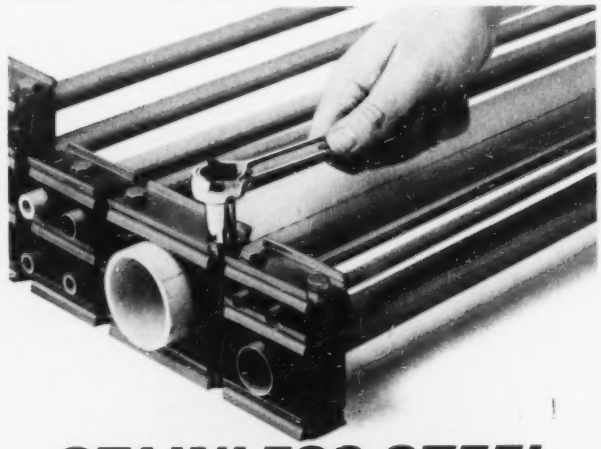

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installations and rebuilds for certain grades while disposing of excess capacity, according to Takashi Saito, president of Daishowa Paper Mfg. Co. Ltd.

Although capital spending has remained high, total Japanese industry paper and board capacity will increase only 0.5% from fiscal 1984 to 25.38 million tons in fiscal 1988. Printing and writing paper capacity will decline by 2.5% (to 7.06 million tons) during this period, and containerboard will increase by only 1.2% (to 7.7 million tons).

CHANGING RAW MATERIAL MIX. While Japanese paper production grew at a 4.0% annual rate during the 1975-85 period, pulp production only grew at a 0.7% pace. "The reason for this low rate of pulp production is that pulp imports and the use of wastepaper have increased in the Japanese paper industry," according to Toshitaka Ikawa, senior managing director, Taio Paper Mfg. Co. Ltd.

Pulp imports have more than doubled from 850,000 tons in 1975 to 1.9 million tons in 1984, with the strongest growth occurring in bleached kraft pulp. North America accounts for about 70% of current pulp imports, although the share of nontraditional suppliers and the use of hardwood has been increasing.

Wastepaper use in Japan has increased significantly because of the oil crises, which increased emphasis on eduction in energy, raw material, and capital costs. Wastepaper consumption rates rose from 37% in 1975 to about 49% in 1985. Development of new deinking technology mainly used for newsprint production and greater use of wastepaper in paperboard also contributed to the growth.

Also helping to increase the use of wastepaper as well as domestic pulpwood consumption was a sharp rise in imported woodchip costs in the early 1980s. Total pulpwood consumption by Japanese mills rose from 33.1 million m^3 in 1974 to a peak of 33.6 million m^3 in 1979. This dropped to 30.7 million m^3 by 1984. The share held by imported pulpwood declined from 46% in 1979 to 40% in 1984, which was the same level as in 1974.

The U.S. share of imported pulpwood dropped from 63% in 1974 to 42% in 1984, with an increasing volume of pulpwood coming from Australia, Canada, New Zealand, and South Africa.

IMPROVED PROFITABILITY. Profitability of the Japanese paper industry has lagged behind other manufacturing because of interest costs from heavy debt built up during its earlier rapid expansion phase. Profitability, however, improved greatly, in fiscal 1983-84, helped by efforts to reduce pulpwood and energy costs, according to Tadami Nasu of Sanyo-Kokusaku. But Japanese paper industry profits may come under pressure again because of recent weakening in paper and paperboard prices, slower economic growth, and increased competition from imports. ■

PAPER INDUSTRY SHOULD BRACE FOR GROWTH OF EDI SYSTEMS IN BUSINESS

Adoption of new electronic data interchange technologies throughout business world could cause significant loss in business forms market

By JAMES L. HUTCHISON

The U.S. is on the threshold of implementing new technologies broadly referred to as electronic data interchange (EDI) that will allow business, governmental agencies, and other organizations to conduct business electronically. This action could result in a significant loss in the market for business forms paper by 1995.

There are those that say that the growth in demand will continue close to that experienced in recent years because people will still desire printed copies of the documents, even though electronic communications are used.

I have heard similar comments over the last 30 years in reference to other paper products in the data processing field. I can recall in early 1967 a sales manager forecasting that tabulating card stock would continue to grow at 5% a year for the foreseeable future. Tabulating card stock hit its peak in 1969, two years after the forecast, and during the last 15 years has declined from 550,000 tons to less than 100,000 tpy. Another example is one-time carbonizing paper. In 1974 the trend flattened, and the downturn in usage started in 1980. History clearly shows we cannot assume that the demand for a particular type of paper will continue simply due to economic growth.

Before getting into details, it is important to define the term "electronic data interchange" or "EDI" as it is used in this article. EDI is designed to replace human-readable, paper-based, business documents such as orders, shipping manifests, or invoices, with machine-readable, electronically coded document transmissions from one organization's computer to a computer of a trading partner or between units of one organization. Machine-readable is a key term. EDI, in my definition, is not telex, unformatted human-readable electronic mail, or other textual transmissions.

Second, my figures for business forms paper include form bond, groundwood form bond, and carbonless. They do not include one-time carbonizing and bristols. Nor do they include cut-size papers.

In 1985, the market for business forms paper in the U.S. was approximately 2.6 million tons. This tonnage represents about 26% of total uncoated free-sheet consumption. It is estimated that about 30%, or 800,000 tons, is devoted to external business transaction communications, of which 300,000 tons are business to business. The remaining amount is from business to consumers. An additional 800,000 tons are used internally for transaction purposes. The total tonnage in business transactions is therefore about 1.6 million tons. The remaining tonnage is divided into 800,000 tons for management reports and 300,000 tons for other uses.

The status of EDI in the U.S. can be better understood by examining the industries potentially involved and the steps being taken toward implementation.

Rance Consulting of the U.K. published a diagram in 1982 that describes the volume of business transactions at different levels of the distribution process. Rance noted that the frequency of transactions increases exponentially as the process moves from the raw material level through the levels of production and distribution.

He assumed that five could be the average multiple as the process moved upward from one level to the next. Thus, for each sale by a raw material supplier there would be five sales from commodity producer to the converter, 25 sales moving to wholesalers/distributors, 125 sales moving to retailers, etc. I believe this is a good illustration of the relative magnitude of transactions. The sale from the retailer to the final consumer will probably not shift significantly to an electronic payments system by 1995, but the remaining portions of the triangle require closer review.

A few years ago people thought that EDI would be most likely to occur first at the lower portion of the triangle, i.e., close to the raw material supplier because larger companies would be the most capable of buying hardware and developing the software needed. It is notable that in the U.S. the reverse seems to be true, i.e., it is the business sectors at the top of the triangle—the retail-wholesale business with the larger volume of business transactions—that have been in the forefront of the

Mr. Hutchison is vice president, paper group, American Paper Institute, New York, N.Y.

move ment to EDI. In other words, it is not the size of the organization but rather the volume of transaction documents that is the major motivating force.

INDUSTRIES MOVING TO EDI. Starting at the retail level, the retail grocery industry commissioned the consultant firm of Arthur D. Little to conduct a feasibility study. ADL estimated that about 100 million business transactions documents are generated per year between food producers, distributors, and retail stores. The grocery industry has created a communications standard for electronically transmitting these documents.

This system will ultimately work in the following manner. Each product has an inventory level stored in the computer. As items are scanned out of inventory, the computer decreases inventory count and automatically communicates a reorder to the central warehouse or distributor. The distributor then groups these reorders in truckloads and ships them to the stores. Upon arrival, the store scans the material received, updating the count in the computer. The system would work in a similar way between the distributor and manufacturer.

The grocery industry was somewhat slow in using the system, but by early 1986 the companies in the industry realized that it had become the accepted way of doing business. Seventy percent of the manufacturers and over one third of the supermarket chains are now actively involved in the system in some manner.

In nonfood retailing, K Mart is one of the largest general merchandise chains. It issues an average of 200,000 purchase orders to vendors every operating day. This company is encouraging the use of EDI by holding classes for vendors and emphasizing the savings possible with an EDI system.

The wholesaling/distributing sector of the economy is presently the most active sector because it must communicate forward to the retailer and back to the supplier. The National Industrial Wholesalers Assn., the National Office Products Assn., and the wholesale drug industries have all established EDI systems that will be operational this year.

In manufacturing, some companies in the paper industry have been involved in steps leading to EDI for the last two years. A few companies are presently transmitting shipping manifest information to some customers. The move to EDI will accelerate markedly in 1986. In addition, about a half dozen companies have developed online interactive systems to provide improved com-

PAPER INDUSTRY LAUNCHES EDI TO AID CUSTOMERS

When U.S. paper and paperboard mills make shipments to customers this year, a significant number of them will communicate with the buyer of the product by a new means: electronic data interchange (EDI).

American Paper Institute vice president James Hutchison explained the industry's plans in a statement issued during API's annual Paper Week meeting. The EDI systems discussed by Hutchison were developed jointly over the last two years by API, Graphic Communications Assn., American Newspaper Publishers Assn., Canadian Pulp & Paper Assn., National Paper Trade Assn., "and related trade associations," he said.

So far the industry has focused primarily on developing electronic shipping manifests, although standards for electronic transmission of other data are being produced as well. API initially issued guidelines for the use of bar codes in November 1983. Bar codes are used to read information from rolls of paper and enter the information into a computer system.

Once the information exists in electronic form, it can be communicated in two ways, Hutchison explained. First is the online/interactive system in which one party transmits data directly to the other and can also respond to requests from the receiving party. Second is the batch system in which a collection of information is assembled and then sent in a single, discreet communication from one party to another, either directly or through a third party that acts as an intermediary.

In February 1985, GCA issued a set of standards called Embarc, which is "designed to provide for the transmission of shipping manifest information from paper mills to merchants, printers, and publishers." Hutchison noted that companies that have been involved in developing Embarc "already have or will shortly commence transmissions utilizing Embarc."

In October 1985, a group of about 40 representatives of paper companies, merchants, and printers met to hear presentations from three companies that act as electronic intermediaries—in effect, receiving shipment data and other information from mills and then taking the responsibility for ensuring transmission to the customer.

The group chose General Electric Information Services Co. to be the "recommended network" for paper shipments. Mills may choose to communicate with customers through GEISCO, or they can communicate directly or by any other means they desire. The intermediary system has been tried out successfully, first with three mills each transmitting to one customer, and then with several mills communicating to multiple trading partners.

Containerboard mills. Meanwhile, API's Fourdrinier Kraft Board Group (FKBG) worked out a version of the American National Standards Institute's ANSI X-12.10 EDI system. The final text of the FKBG standard was published Mar. 31, and containerboard mills are expected to begin electronic transmission of data using the FKBG/ANSI standards in the second half of 1986.

Hutchison explained that "ANSI standards will be used by the containerboard segment of the paper industry, as well as practically all U.S. industries, including automobiles, aluminum, steel, chemicals, and retail stores." In addition to shipping manifests, there are also ANSI standards for "orders, invoices, and other business transaction documents."

A few companies have worked to develop their own interactive systems, but some buyers have asked the industry to develop more uniform standards for such transmissions. Work toward such simplification "will be a major activity in 1986," according to Hutchison.

munication with customers. The automobile, steel, aluminum, chemicals, and electrical industries will also start to operate their planned EDI systems this year.

Transportation was one of the first industry sectors to adopt EDI standards and establish a communications network. In 1984, 90% of all rail waybills were exchanged electronically. Bills of lading and freight bills are also being transmitted. In addition, 40 motor carriers are using the system.

Bank-to-bank EDI is very advanced. However, a great deal of sophistication is required in the payment of funds from one company to another through the banking system. This program is still in development, and we are not likely to see any significant impact on paper checks in the U.S. until after 1995.

In government, the Customs Service is planning to initiate an electronics system this year, with the goal of handling 80% of the documents via EDI by the early 1990s. The Customs Service has the motivation to move to EDI because of the large volume of documents it must handle. In 1980, it processed 4.4 million entries and anticipates that this number will double by 1990. Each entry represents about 50 pieces of paper.

IMPACT ON PAPER USE. It is clear that a major move is under way to use EDI and related technologies. The question is how much paper will be replaced and when it will happen.

- McDonald Douglas, a third party network operator, forecasts that EDI will grow about 70% per year, from $600 million in revenue in 1986 to $3 billion in 1990.
- A consultant company, the Yankee Group, states that "the scope of the intercompany network market is ultimately as large as the entire business community. Eventually, almost every business, regardless of industry and size, will become a candidate for intercompany networking."
- Arthur D. Little estimates that by 1995 at least 50% of grocery industry business transactions will be handled electronically.

All these organizations predict that the use of paper to parallel the electronic communication will be eliminated *as quickly as possible*.

Some say that the only papers that will be replaced by EDI are the documents moving through the mail. However, I believe the use of electronic transmission in business transactions will result in a major reduction in hard copy used internally in support of these transactions. As a result, the reduction in the amount of paper used within a company relating to business transactions will have a far greater impact on overall paper use than the copies now mailed.

Of course, two other factors also have to be included in the equation when future demand is considered: the rate of growth of the U.S. economy and the consumption of business forms papers for end uses other than business transactions. I am presenting what I believe are reasonable forecasts of growth rates of paper from 1985 to 1990 and 1995. The percentages are not meant to be precise forecasts but were used to establish the potential impact of EDI on business forms. You can see that growth in forms management control is still expected (Table 1).

TABLE 1: **U.S. consumption of business form papers (000 short tons).**

End use	1985	1990	1995 with 25% loss of 1990 transaction document levels to EDI	1995 with 40% loss of 1990 transaction document levels to EDI
Business-to-business	1,100	1,350	1,000	810
Management reports and other	1,500	2,000	2,650	2,650

Note—levels in 1995 with no EDI: business-to-business, 1,500; management reports and others, 2,700.
Source: American Paper Institute, James L. Hutchison, presentation to API Paper Week, March 1986.

As far as tonnage is concerned, since it is not possible to forecast exactly what the impact will be, I have developed data based on an assumption of EDI penetration of 25% and 40%. This does not mean 25% of all businesses would adopt EDI but rather that EDI will make up 25% of the volume of business transactions. It is estimated that 20% of the companies account for about 70% of the business transactions.

If we assume 40% of business transactions will be handled electronically in 1995, the market for business forms paper in the U.S. would equal about 3.46 million tons, about 3% higher than in 1990. Another comparison is to consider what the difference between the 3.46 million consumption would have been without EDI, as shown in the right-hand column of Table 1. You can see that difference is 740,000 tons.

On the other hand, if the move to EDI is made by only 25% of the business transaction and related papers, a 9% increase in consumption would occur from 1990 to 1995.

Whether the figure is 25%, 40%, or some other percentage, it is clear that EDI use is due to grow at a phenomenal rate in the U.S. over the next ten years and that significantly less paper will be used in business transactions than would be expected by projecting historical growth trends.

Electronic data interchange will not only impact the consumption of paper. It will also cause a major change in the way paper companies and all U.S. industry conducts business. The relationship between buyers and sellers will be altered. The time frame for providing information to the customer will be reduced. Managers will have to learn to more effectively use electronically provided data in analyzing their market performance. This is the watershed year! ■